June, 1945 Vol. 34, No. 6

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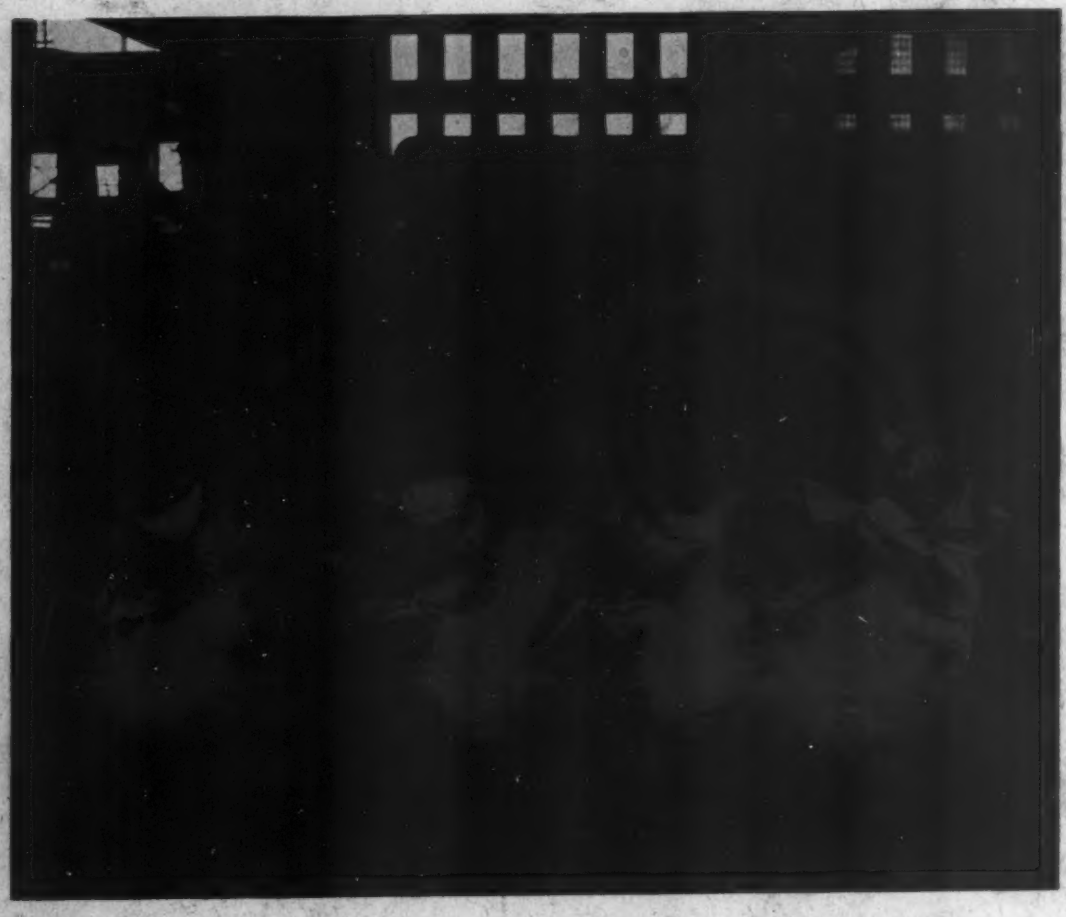
INDUSTRIAL ARTS AND VOCATIONAL EDUCATION



The Shop Teachers' Professional Magazine

. . . YET THEY MUST BE *Right!*

Milling Machine Vises may look like simple "gadgets" — but actually they are precision tools, with operating surfaces accurately ground to size and squareness and built to take hard, everyday punishment.

It is only reasonable that a manufacturer of milling machines is best equipped to produce milling machine vises. Kempsmith has specialized in building precision-built milling machines and equipment for *more than a half-century*. That's why you'll find it pays to buy Milling Machine Vises and other Milling Attachments from Kempsmith.

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WRITE FOR NEW CATALOG 100-D

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For a new start in this new era it is essential that the tools for instruction keep pace with industrial progress . . . You can depend upon your selection of South Bend Precision Lathes, for these are the lathes your trainees will find so widely used in metal working industries and service trades. And—their precision, versatility, and ease of operation will simplify the teaching of modern shop practice.

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466 EAST MADISON STREET • SOUTH BEND 22, INDIANA • *LATHE BUILDERS FOR 38 YEARS*

Train them with the tools they'll be using on the job! There is every advantage in having your students work with fine tools during the formative training period. They get the "feel" of precision, speed and power. They gain enduring respect and preference for the quality of tools that will help advance them in their craft.

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IMPROVED

STANLEY ROUTER-SHAPER

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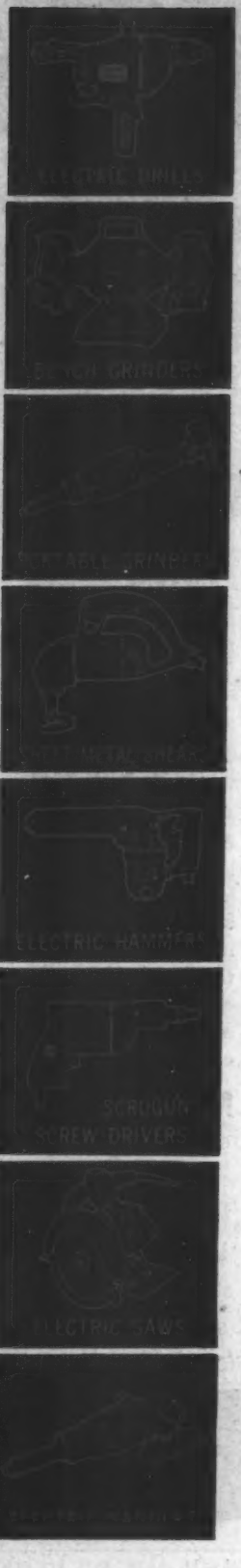

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DIVISION OF THE STANLEY WORKS • EDUCATIONAL DEPT.
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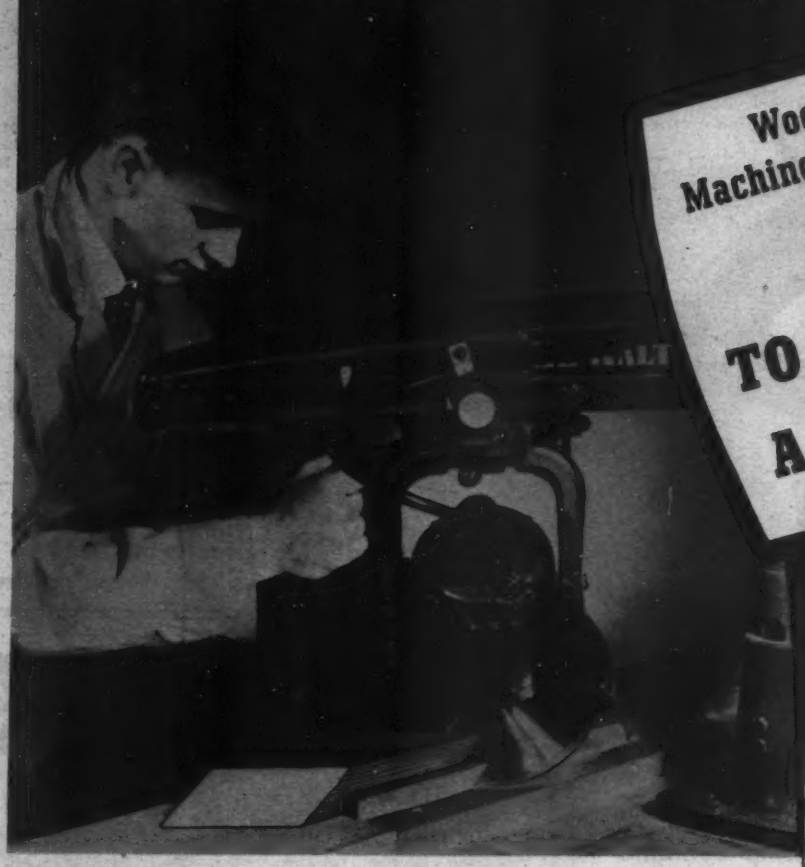
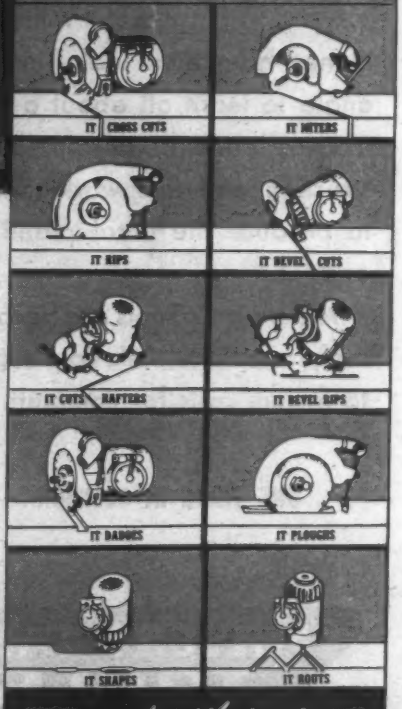
Make this a required course . . . and your wood-shop training is complete!



Wood Shop Machine Course No. 1

HOW TO OPERATE A DE WALT

DE WALT is a complete shop in itself



...and with proper tools makes any cut possible!

Yes . . . this is the No. 1 machine course in today's vocational schools . . . learning how to operate a DeWalt.

Knowing how to make the fullest use of this flexible, easy-to-operate machine will give any student a head-start as he prepares for tomorrow's industry.

When he leaves school he will be fully acquainted with a machine that is destined to occupy a prominent place in tomorrow's industry. The perfection of the DeWalt Saw has created new methods in cutting wood, making obsolete old-style equipment previously used.

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Excellence of design, advanced construction and fine workmanship combine to produce the ideal plane for teaching and learning.

Millers Falls Tools are becoming increasingly available. Ask your supplier or write to Millers Falls for complete details.

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SINCE 1868

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Clayborne Positioning Equipment
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- 100% Safe—prevents accidents—sturdy and mobile
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- There is a Clayborne engine stand for practically every type of aircraft or automotive engine

For V-8, 80, 90, 95 engine stand. Photo courtesy Lane Tech. H.S., Chicago.

Small radial aircraft engine stand. Photo courtesy Purdue University.

Write for Catalog

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Columbian Continuous screw Woodworker's vises are furnished with hard wood handles — or may be equipped with ADJUSTABLE STEEL HANDLES, as above, to eliminate handle breakage, speed operation and provide extra leverage.

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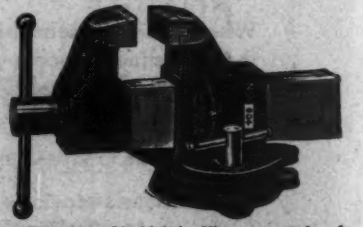

Columbian Machinist's Vises are made of malleable iron castings, guaranteed unbreakable, and designed to provide accurate, dependable equipment for school and industrial shops. All standard types.

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Speed! And simplicity, too. This fast, power-driven file grinds and smooths, does any of a thousand cutting and burring jobs—in a matter of seconds!

Because of their filing action they will cut and remove metal without creating a burr.

Delta Rotary Files are made of high speed steel for use in electric or air-driven portable tools, or flexible or stationary shaft machines. There's a Delta Rotary File in every shape and size.

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Tell your classes about Delta's plus production capacity.

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DELTA FILES

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● Belt Type SKILSANDERS are so light in weight, so powerful, compact and perfectly balanced that they make it easier for any student to accomplish fine finishing faster on all flat surfaces of wood, metal or compositions.

And to help you keep your shop costs in line, SKILSANDERS are *quality-built* throughout to last longer and operate for less with a minimum of servicing.

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TURRET LATHE AND SCREW MACHINE TOOLS

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Write for catalog

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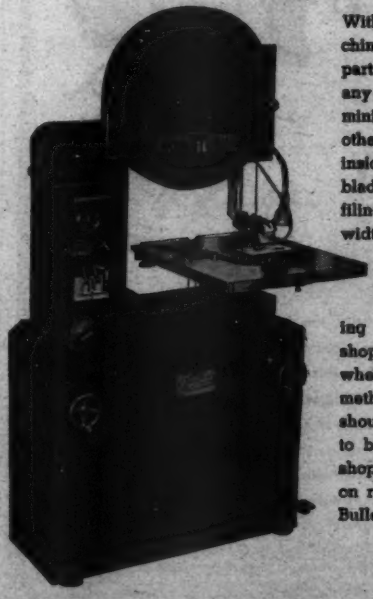
Tannewitz DI-SAWS

Most Essential Requirement for Your Machine Shop!



With this extremely versatile machine, tools and dies, machine parts or other items of practically any shape may be made in the minimum of time from steel or any other material; for it provides for inside and outside sawing, using blades 3/32" to ½" wide, chain filing — in three different file widths, and endless belt polishing. Because of this great versatility as well as the fact that these machines are being widely used in machine shops throughout the country where they are obsoleting other methods, a TANNEWITZ DI-SAW should be the number one item to be purchased for your school shop. Complete details furnished on request. Just ask for DI-SAW Bulletin.

THE TANNEWITZ WORKS, GRAND RAPIDS, MICH.

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When Selecting Equipment FOR VOCATIONAL TRAINING

Walker-Turner Drill Press performing special tapping operation at Industrial Timer Corp.

The real measure of Walker-Turner Machine Tools' value in vocational training lies in the diversified standard machining operations they are performing throughout Industry — and the great number of special operations to which they have been adapted. To school shops, these machines give an over-all industrial realism that cannot be obtained with less versatile equipment.

Important, too, are those Walker-Turner features which are particularly essential in industrial training—things like simplified design, easy operation, rugged construction and the latest in safety engineering. Moreover, Walker-Turner Machine Tools are priced to fit your budget, promptly available for war production training. Follow the lead of the industries for which your students are being trained. Send for complete story on Walker-Turner Machine Tools.

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Walker-Turner Radial Saw cutting a coil form at General Ceramics and Steatite Corp.

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When your pupils leave the classroom and embark upon their chosen trade, chances are good that Atkins Silver Steel Saws will be the tools they choose. Teaching them with Atkins Saws *now* means faster learning and better work. These fine saws have a "feel" that is natural and keen teeth that hold their edges for long periods. What's more, their ruggedness is an extra asset in the class room, where green hands are likely to give saws a real work-out.

Free—Wall Chart on Saw Filing

Illustrates in detail the right way of filing and setting saw teeth. 19" x 25", it's suitable for wall mounting. Sent to you free on request.

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"MACHINE-OF-THE-MONTH"

No. 10 JOINTER

Direct drive at 3600 or gear drive at 5200 r.p.m.! 8" *four*-knived cutter-head with knives set askew for *shearing* cut! Taper roller bearings. Semi-steel tables. Capacity to cut ¾" deep.

What a Jointer! This quality-built Wallace No. 10 Model has power — speed — capacity and accuracy in a measure never known before!

Skew-set knives take a shearing cut — does *perfect* edging work, rabbetting, bevelling. Smooth, clean surfacing cuts seldom require sanding.

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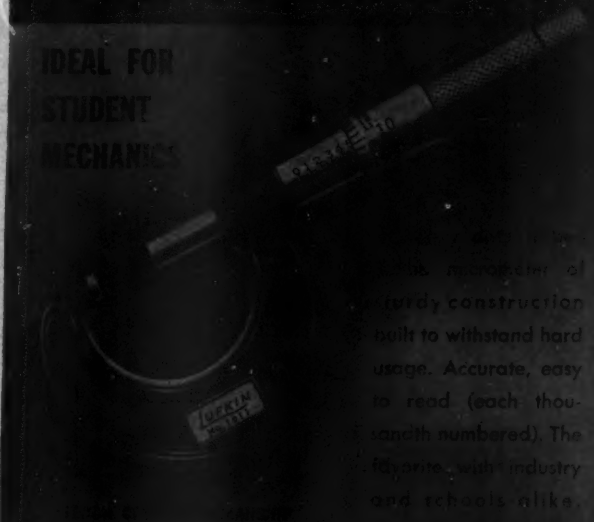

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SAGINAW, MICHIGAN · NEW YORK CITY
TAPES · RULES · PRECISION TOOLS

Students Will Get a "Kick" Out of Building this All-Plywood Dinghy

When students are really interested in classroom work, half your teaching job is done. And here's a project that combines real interest with a practical, instructive subject. The 7' 9" pram dinghy sketched above is easily built because it utilizes Douglas fir plywood — the modern "miracle wood" which hundreds of instructors have found so ideal for classroom use. Plywood comes in large, light, split-proof panels. It is readily worked either by hand or with power tools. It takes any finish, easily and quickly. It helps give students a feeling of accomplishment — makes them enjoy their work, too, especially with a boat to build. Send for boat plan 24. It's free.

DOUGLAS FIR PLYWOOD
LARGE. LIGHT. STRONG.
Real Wood PANELS

Today Douglas fir plywood is available only for war needs and essential building. But you can plan now to use plywood in classroom instruction the moment war restrictions are lifted. Keep in touch with your dealer!

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He's in there "Punching" with BERNARD *Tools*

Sketched from an actual photograph, this illustration of a wounded veteran learning how to again use injured muscles with a Bernard leather punch, is typical of scenes in rehabilitation hospitals everywhere. Many Trade Schools are working with the War Department in such veteran rehabilitation efforts. Priority orders for Bernard tools from such schools can be filled with reasonable speed.

Bernard Belt Punch No. 386

Besides the leather punch, No. 386 illustrated at right, there are many Bernard parallel action tools of particular value in the industrial classroom.

Bernard Pliers No. 102

Bernard No. 102 parallel jaw, side cutting pliers are tremendously powerful and exceptionally handy.

The Schollhorn line of Bernard tools includes pliers, nippers, punches, dividers, aviation shears and many specialized tools. Write for catalog.

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Courtesy Boeing Airplane Co., Wichita Division

Illustration shows HARGRAVE Individually-Tested Clamps used in construction of an installation drill jig for production of the mighty B-29 Superfortress. Throughout the nation's aircraft plants, HARGRAVE Clamps find hundreds of applications, which help to speed and improve aircraft production.

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Showing the complete Hargrave Line of Clamps, Chisels, Punches, File Cleaners, Washer Cutters, etc.

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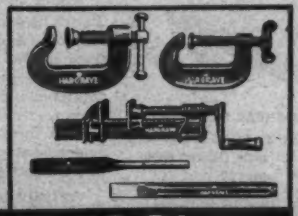
THE CINCINNATI TOOL CO.
Founded in 1879
Waverly & Main Aves.
Cincinnati 12, Ohio



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BURRILL'S
Paramount Band Saws

Your students should be provided with *BAND SAW BLADES* which have been adopted as being able to stand the stiff requirements of War Production Plants.

Accurately made Band Saws of extreme toughness enables more work to be produced in less man hours.

All sizes are carried in stock for prompt shipment.

Exclusive Band Saw Manufacturers.

PARAMOUNT SWEDISH BANDS
ACCURATELY SPACED TEETH
NO CRUSHED POINTS - GUARANTEED

BURRILL SAW & TOOL WORKS
ILION, N. Y.

You'll help students do better woodworking when you put this tool in the school shop!

The Carter Type S4A Beading and Fluting Attachment

Makes the "difficult-looking" beading and fluting on period furniture easy to duplicate. The Beading and Fluting Attachment is moved along the bench or lathe bed and against the work, which is held between centers. The guide on the cutter shaft controls the depth of cut. The 18,000 r.p.m. of the ⅓ h.p. motor gives fast, smooth workmanship.

Makes the "hardest part" of period furniture actually the most fun. It's a tool that will really help your students become interested in fine craftsmanship and expert design.

That's worth doing something about — promptly. Today, write for the full story of the Carter Type S4A Beading and Fluting Attachment.

STANLEY ELECTRIC TOOLS, Dept. C
New Britain, Conn.

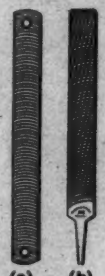
CARTER STANLEY TOOLS

(NICHOLSON "FIRST READER" ON PLASTICS FILING—Continued from last month)

Round and Half Round files are used for cleaning out holes or slots with rounded surfaces. Knife and Warding files are used to reach down between flutes or into other narrow slots and grooves.

Filing Large Areas

When large areas are filed or when the corners and edges of large sheets are to be beveled, Curved Tooth files provide an excellent tool. These files are fast cutting but still leave an excellent finish. They are relatively coarse files having a series of curved teeth which are *milled* in, not cut. They are available either in flexible or rigid types and in different degrees of coarseness. Curved Tooth files can be used for filing plastics provided conditions permit having a sufficient number of teeth in contact with the surface filed so that the sharp, keen teeth do not "dig in" too deeply to make smooth, even strokes. These Milled Tooth files can be used for filing lengthways on the corners and edges of sheets or on other narrow surfaces provided a sufficient number of teeth are in contact with the work.



(a) MILLED TOOTH FILE (flexible type)
(b) SUPER SHEAR FILE

Filing Hard Plastics

The filing of the hard or thermosetting plastics involves few serious problems limiting the selection of files. A file of convenient size, in the cut necessary to give the proper combination of stock removal and finish, can generally be used without any difficulty. In removing light flash, a rapid, light, sweeping stroke is all that is required.

Filing Soft Plastics

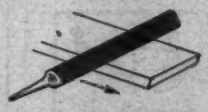
From the viewpoint of filing, the thermoplastics can be divided into two groups: those that are relatively very soft, such as the acetates and butyrates, and those that are somewhat harder yet considerably softer than the thermosetting phenolics and ureas. The latter group includes the vinyls, acrylics and the styrenes.

The thermoplastics are characterized by a rough, rubbery flash that has a tendency to seize and gum if heated by the cutting action. The flash cannot be easily broken but it can be bent in against the body portion and then filed through close to the line.

In filing the very soft thermoplastics, the fine cuts of files should be avoided because of the tendency for the teeth to become clogged up. Such files as Mill Bastard (single cut) or Flat and Half Round Bastard (double cut), which can be used on the hard plastics without any difficulty at all, are apt to become filled up with the shreddy material removed from the very soft plastics.

The best types of files for use on these soft plastics are coarse, single cut, diagonal tooth files in either Flat or Half Round shapes. The teeth should be cut on an angle of from 35 to 45 degrees. The combination of the coarse cut and the long angle provides a self-cleaning feature which makes files of this type well suited for filing the very soft plastics. Because of the long angle of the cut and the relatively wide spacing of the teeth, the tendency is for the shreddy material to be pushed out from between the teeth. The file should be held at an angle of about 45 degrees and used with a long shearing or sweeping stroke toward the right. Files of this type have the following advantages: (1) coarseness of cut minimizes clogging; (2) fast cutting even when used with very light pressure; and (3) good finish. Although Curved Tooth files have many applications on plastics that are somewhat harder than the acetates, they are not recommended for filing the very soft plastics. Because of the curved teeth, it is difficult to maintain the proper angle at which to hold the file in relation to the work.

The vinyls, acrylics and styrenes are sufficiently harder than the very soft acetates so that relatively little trouble is experienced with the file teeth clogging up. Where it can be done, it is better to avoid using the finer cuts and, if they are used, light pressure should be used to minimize any tendency towards clogging. These plastics are easily filed and, except for avoiding the finer cuts where possible, the same principles in selecting files can be used as with the harder thermosetting plastics. Super-Shear files (illustrated) are very satisfactory for use on this group of plastics.


SUPER-SHEAR FILE APPLICATION ON EDGE WORK—about 45° angle (curved tooth about 20°)

Filing Laminates

Laminates are usually formed with synthetic resins of the phenol-formaldehyde type, with various materials being used for filler. The properties of the filler materials determine to a considerable extent the properties of the resultant laminate. Much of the filing done is on the corners and edges of sheets. Any of the standard cuts of files can be used, but with the coarser cuts it is advisable not to file "off" sharp corners and edges as this is apt to result in some delamination of the layers at the corners of the edges. In filing across laminations, the direction of filing should be such that it tends to press the lamination together. The filing of laminated sheets is generally for the purpose of smoothing up corners of sawed sheets, beveling corners or burring drilled or punched holes. Filing is ofttimes required in the fitting of panels.

Mill Bastard or Milled Tooth files are commonly used on the corners and edges of sheets for beveling or removing burrs left from sawing operations; Flat or Half Round files for fitting panels; Half Round and Round files for burring drilled or punched holes and other shapes and cuts.

Filing Impregnated Plywoods

These plywoods consist of multiple layers of relatively thin veneers which are impregnated with a resin and then super-pressed. This type of product is hard, tough and dense, and the resin with which the wood fibers are impregnated has an abrasive action on the file teeth. Best results will be obtained by using files that have been prepared for use on plastics. The file teeth will become filled with light, fluffy wood dust, but this can be very easily removed when it accumulates sufficiently to interfere with the cutting of the file.

Any of the regular cuts may be used, but it is recommended that the coarser cuts be used wherever possible. Double cut Bastard files in any of the common shapes and sizes will leave a good finish and remove material much faster than the finer cuts. Such files as 12″ Flat or Half Round Bastard will produce a very good finish. The finer cuts leave a very smooth finish and single cut files, such as Mill Bastard, leave almost a polished surface.

When large surfaces are filed. Curved Tooth files are recommended for both stock removal and finish. These files should be used in the standard cut in either rigid or flexible types. Flexible files mounted in a holder are especially effective. The sharp, keen teeth of these files remove the material in the form of light shavings. For many operations on the impregnated plywoods, these Curved Tooth files are unexcelled.

As on other laminated plastics, care must be taken when filing "off the edge" especially with the coarser files. Mill files, which are used for beveling sharp corners and for producing a very fine finish, can be used for filing off the edge without danger of causing delamination or splintering of the outside layers of veneer. Even such files as 10″ or 12″ Flat Bastard will not give a great deal of trouble in this respect unless excessive pressures are used; but, in general, wherever it can be done, it is preferable to file onto the edge.

In selecting files for use on plastic materials, it should be borne in mind that the same principles apply as regards size and shape as on any filing job. On the hard plastics, practically any cut may be used that will meet the requirements as to stock removal and finish. On the soft plastics, coarse files should be used wherever possible with the finer cuts avoided on the very soft plastics. The laminates and plywoods are somewhat similar to the hard plastics in regards to the selection of files. In many cases, general purpose files will be found satisfactory, but better results can be expected from files that have been made expresly for filing plastic materials and have the proper tooth structure and necessary keenness.

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This Month's Cover

Our cover picture this month shows Elder Rice, training instructor, supervising apprentice welders, at the Ambridge, Pa., plant of the American Bridge Co., United States Steel Corporation subsidiary.

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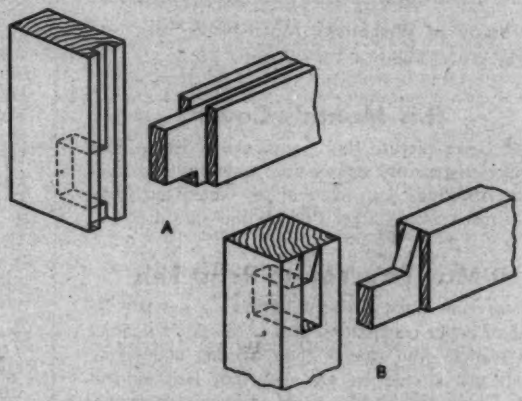

MORTISE-AND-TENON JOINT

The haunched mortise-and-tenon joint (A) is generally used when a panel is to be built into a frame. Since both pieces are grooved their full length, the haunch provides lateral stiffness and prevents light from showing through the joint. The table (or taper) haunched joint (B) is a modified form which is used to join the rails to the legs of tables. It is somewhat more attractive in appearance.

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Reliability of Shop Grades

*Comdr. C. C. Caveny, U.S.N.R.**
*Lt. J. A. Weichelt, U.S.N.R.**

This is still an age which measures values in hours and years. Even college degrees are expressed frequently in semester hours and may, or may not, indicate real ability. The pay of civil service and business employees is influenced largely by length of service.

In the educational profession time also brings prestige, and prestige often stops wholesome scientific thinking, and may impede efficiency and progress. The business world has at least one reliable grading system — no matter how much prestige an executive may have he loses his job if he does not produce money for the stockholders.

The data presented in this article will prove that the grading problem can be solved by the proper approach.

Why We Investigated Grades

The following simple experiment demonstrates that the reliability of shop grades is not a very dependable quantity. In one of the shops selected for research the instructors were required to use a grading analysis chart which listed the factors to be considered in arriving at a grade. Each factor was weighted and described in detail and grades were given only for completed work jobs. Three different qualities of performance were described for each operation of the job. The grading system was referred to, by the shop instructors, as an "objective method of grading." It was supposed to be completely standardized and everyone took it for granted that here was an outstanding example of scientific grading.

Ten instructors were asked to submit grades on 18 different jobs, each numbered for identification purposes. The grades assigned to each job were plotted and are shown in Chart 1. Each column shows ten plottings of grades on the same job. Proper interpretation of the grading analysis chart by each instructor should have resulted in identical plottings in each column. Later we found that this particular experiment was just one example of a typical condition revealed by research on grades and we realized that something was wrong. It was difficult to find two instructors who agreed on a grade to be assigned for a particular work job, but in all probability each instructor would say he was sure he was right. But it is unfair to expect perfection. Some differences of opinion should be tolerated. The instructor's grades should still be roughly significant as an index of the trainee's ability as expressed in his performance on the work job.

Another grading method was devised which could be used as a standard for comparison with the grades that were actually presented by the instructors. This comparison was intended to show whether the grades assigned by the instructors were any better than just a pure guess. This other grading method was called the "roulette wheel" method.

The "roulette wheel" method is just a fancy name for a series of grades which have absolutely no significance. By this method the grades are nothing but pure guesses. Pure guesses could be obtained as follows: Take an ordinary roulette wheel, remove the numbers and post various typical school grades in the positions where the numbers were removed. The first trainee is assigned a grade by spinning the wheel and giving him the grade that is indicated by the pointer when the wheel stops spinning. Each successive grade is assigned in a similar manner. The same results could be obtained by pulling slips of paper out of a hat at random or simply by guessing.

Chart II shows a series of grades that were produced by the "roulette wheel" method. A comparison of the two shows them to be very similar, and it would be quite impossible for anyone to pick the chart which shows the grades actually assigned by the instructors if the two were not labeled.

If instructors' grades are no better than a mere guess, then the "roulette wheel" method may have many advantages over traditional methods of grading. It must be admitted that it is easy to use, it is fast, and it is honest, because it is a frank admission that the grades are worthless.

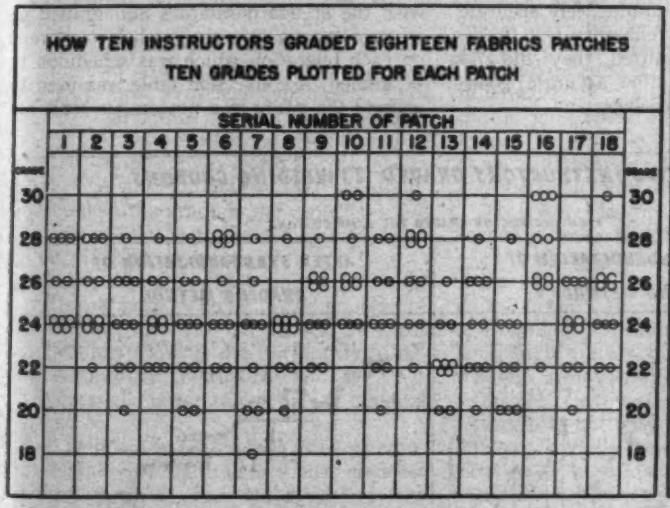


Chart I

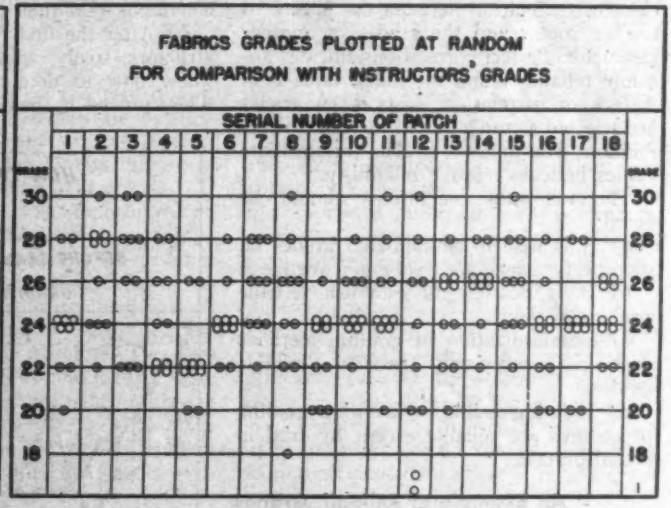


Chart II

Why We Did It

The principal reasons for investigating reliability of grades were:

*Naval Training Schools, Navy Pier, Chicago, Ill.

a) To find if the grades are fair to the trainees.

b) To find what grading methods are best and what must be done to get accurate grades.

c) To prepare a basis of measurement of teaching accomplishment to be used for improving instruction and rating instructors.

d) To find what valid conclusions could be made from grade correlations used in research.

Why This Was Important

a) Research proved that fairness of grades was one of the most important factors in trainee incentive to learn.

b) Since only the top ranking trainees were rated, it was also important to determine accurately how the trainees should be ranked.

c) Testing proved that some shops had reliable grades and others did not. It was important to find out why and what methods were used so that all grades could be made reliable.

d) It became more and more evident that research on educational problems occasionally would lead to entirely false conclusions unless there was a properly evaluated criterion of trainee accomplishment.

e) It was highly desirable to get an impartial and impersonal measurement of teaching accomplishment for upgrading instruction and advancing instructor ratings.

Reliability of Shop Grades in General

The reliability of grades in other shops was also tested and the reliability coefficients are shown in Chart 3.

The reliability of the grades indicated by the tests was measured in the form of a reliability index. This index is the coefficient of correlation between the grades of one instructor and the grades of another instructor. Perfect correlation indicates absolute reliability and the index value is 1. A lack of correlation exists when grades are selected at random and there is no correlation. The index is 0. The intermediate values indicate relative reliability.

The following conclusions should be noted:

a) It is wise to assume that grades on shop performance are frequently worthless.

b) It is possible to establish reliable grading methods.

c) Standardization of grading methods does not necessarily produce reliable grades.

d) It is impossible to say what grading procedures are reliable except by trial in actual practice.

An Example of Reliable Grades

The development of a reliable grading method in the Welding Shop was an outstanding accomplishment. A difficult problem was solved with excellent results. The chronological phases of the research and development of the problem were as follows:

CHART 3

Reliability of Grades on Finished Work Jobs

Figures indicate the coefficient of correlation between the grades assigned by one instructor and the grades assigned by another instructor on the same work job.

	Grading Procedure		
	A	*B*	*C*
Welding Shop			
Smoothness of bead	.61		
Penetration with fusion	.22		
Entire weld coupon	.32	.51	
Test 1 (weld coupon)			.00
Test 2 (weld coupon)			.93
Test 3 (weld coupon)			.85
Test 4 (weld coupon)			.92
Test 5 (weld coupon)			.93
Sheet-metal Shop			
Flanged parts tray	.55	.56	
Stringer repair			.67
Fitting			.90
Hand Tools Shop			
Anchor plate	.26	.61	.73
Drag wire fitting			.61
Reinforcing plate			.80
Controls Shop			
Cable splice	.48	.76	
Cable splice	.93		
Squadron Operations			
Engine check	.36		
Fabrics			
Patch		.19	

A) Grades assigned by instructors without any standardization — completely subjective.

B) Grades assigned by instructors using a detailed description of point values for each kind of performance on each operation of a job (so-called "objective" method).

C) Grades determined by regularly assigned graders with the procedures thoroughly standardized.

a) The instructors expressed the firm conviction that their grades were accurate.

b) After the first reliability test the instructors freely admitted they did not know how to determine accurate goods. They proved it themselves.

c) It became the general opinion that there was no shop performance more difficult to grade than welding.

d) The first reliability test, after the method was thoroughly standardized, was a total disappointment. There was absolutely no correlation between a first and second grading of a sample of jobs used for the test.

e) After a sincere effort to make the standardized procedure effective, the results were satisfactory.

f) Other reliability tests were made subsequently, and these tests indicated the method was *consistently* producing excellent results.

g) *After* welding grading methods became reliable the opinion was generally expressed that welding performance was easier to grade than performance in other shops.

Chart 4 illustrates what happened before and after standardization. This chart proves that the most difficult grading problem can be solved. Grading is easy when you know how to do it.

The secret of the success of the welding grades was very simple. The whole basis hinged on the realization that a grade does nothing more nor less than indicate whether one job is better than another. It was only necessary to take the first step by determining whether a job was better or worse than average.

Sample work jobs were gathered and displayed on the wall of the graders' laboratory. Each coupon or sample job was just about average. Samples were also displayed for excellent jobs and acceptable but poor jobs. All these samples were set up as standards of performance.

The grading process was based entirely on comparisons. Each job was compared with the standard samples and graded as average, above average, or below average on each operation which was scheduled to be graded. A conversion table was used to express the grade in a percentage scale ac-

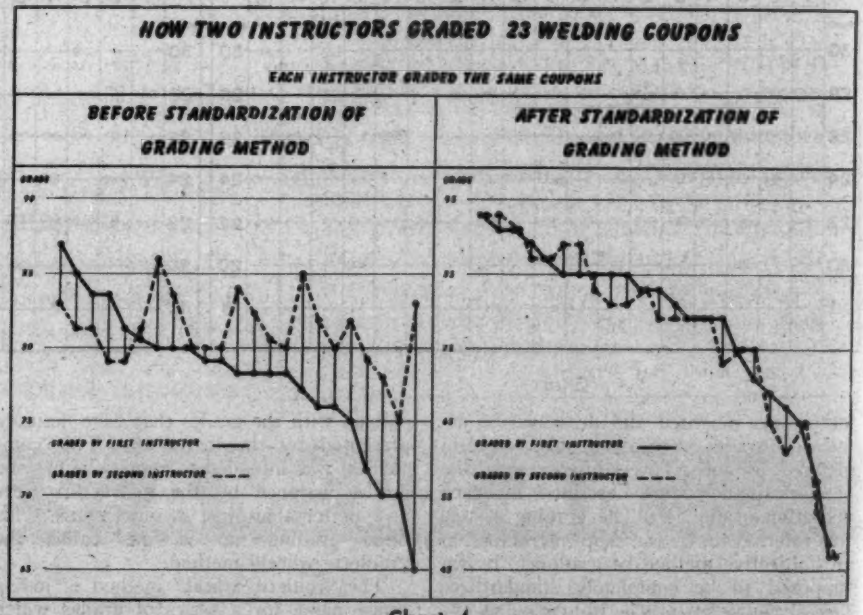

HOW TWO INSTRUCTORS GRADED 23 WELDING COUPONS
EACH INSTRUCTOR GRADED THE SAME COUPONS
BEFORE STANDARDIZATION OF GRADING METHOD
AFTER STANDARDIZATION OF GRADING METHOD
GRADED BY FIRST INSTRUCTOR
GRADED BY SECOND INSTRUCTOR

Chart 4

cording to a standard weighting of the factors considered. Incidentally, the conversion table made it possible to control the distribution of grades so that 80 always meant the long run average performance and the best trainee in a class could expect to get 100.

What a Grade Should Indicate

It is useless to attack a grading problem without a precise, logical, and unambiguous statement of the purpose and objective. The failure to eliminate confusion in an understanding of the objective is one of the most frequent factors in grading problems. The sights must be on the target.

In addition to the objective, certain arbitrary factors must not be overlooked. For instance the choice of grade scale is arbitrary. Any scale will do. The important thing is to know what factors are arbitrary.

The following statements are suggested as reasonable for shop grading:

Why grades are needed

a) For ranking of a group of trainees, to measure requirements for a rating, and for classification purposes in the Navy.

b) To provide an incentive for trainees.

c) To check progress of trainees.

d) To provide a basis for analyzing instructional problems.

Basic Assumptions

a) Four different kinds of grades could be used to serve the four purposes just stated. They would not need to be identical. It is common practice, however, to use one grade for all purposes.

b) The most useful all-purpose grade is one that is an index of the ability of a trainee relative to the ability of other trainees.

c) The term *ability* is intended to include:

(1) Factual knowledge as reflected in written tests.

(2) Skill as reflected in performance on work jobs. (We actually measure performance rather than ability to perform.)

d) The kind of ability that should be reflected in the grade is the capacity to do the job which the trainee will be expected to do after he leaves school.

e) We assume that a trainee's fitness for a rating is best reflected in the average of each week's grade — each week of equal importance. (This is not necessarily a logical assumption, however.)

Suggested steps to define a grading system:

a) Define a basis for indicating whether one trainee has more ability than another and by relatively how much. This is the only factor that is not arbitrary.

b) Define a basis for determining failure.

c) Assign a numerical grade to mark the point of failure.

d) Define the kind of work job required for a top grade (like 100). For example, the best slotted anchor plate ever produced by a trainee might be used as standard for 100.

e) After steps (a) to (d) have been defined, the distribution of grades is completely determined. For example, after we determine the upper and lower limits of the scale, the average is determined by applying the basis set up in step (a).

The more one analyzes the meaning of grades the more one realizes that grades are a ranking process and nothing else. They merely indicate whether one trainee is better than another. Even when there is a standard of performance the grades still have no significance except as an indication of rank in terms of a standard. If the standard is high, the grades are low, and vice versa.

Experience also proves it is difficult to set up a fair fixed standard for failure. It is much more fair to fail an arbitrary percentage of the trainees in a large group. This does not mean that the same percentage should be applied to every class — some clasess may have higher averages than others — but the failures can be determined by thinking of the grades as an indication of rank and failing all trainees with grades below the arbitrarily fixed minimum. It is still a ranking process.

A fair *standard* to be used for ranking trainees on a relative basis would be the expected performance of the average trainee, commonly referred to as the *norm*.

Types of Grading Errors

Some differences between two instructor's grades are due to individual differences in scale of grading. These differences are of two kinds:

a) Differences in average grades of two instructors. One instructor may be *tough* and another *easy*.

b) Differences in the spread or variability of two series of grades. One instructor may grade between 40 and 100 while another instructor may assign no grade below 80 or above 85. (The grade averages may still be the same.)

Some differences in grades are due to differences of opinion on the true quality of the job. These differences are of three kinds:

a) Differences in the factors taken into consideration in arriving at a grade.

b) Differences in the importance attached to each factor (weight).

c) Differences in number of oversights.

These errors are analogous to differences between temperature readings. If one reading is in terms of Centigrade and another in terms of Absolute, the zero readings are different. If one reading is in terms of Centigrade and the other in Fahrenheit, not only are the zero readings different but also one degree variation in Centigrade means more than one degree variation in Fahrenheit. If both readings are on the same scale, there may be differences due to errors of observation.

It is common for each trainee, as well as for the rating officer to assume all grades are based on the same scale. In fact, even the service record marks from different schools are assumed to be comparable. Usually no attempt is made to set the sights for a *zero reading*.

Errors in Scoring

Errors in grading methods are often the result of failure to understand the following points:

a) The choice of a numerical (or any other) scale is arbitrary. Grades can be converted from one scale to another by formula. We can set our average at 75 or at 85. We can let the grades spread between 0 and 100 or between 70 and 100. Tradition is the only nonarbitrary basis for choosing one or the other. However, traditional usage for one instructor may be as much as 10 percentage points higher than for another instructor and the spread may differ considerably. Tradition is confusing.

b) The determination of failure standards or failure grades is arbitrary and these standards must be defined before they can be significant.

c) The assumption that a grade frequency distribution should be of a *normal* type (bell shaped curve) is supported neither in theory nor by observation.

d) If we say that 100 per cent indicates perfection, we mean perfection according to certain standards or tolerances. There can be no absolute perfection. The 100 mark has a relative meaning.

e) When several grades are averaged, weights are assigned to each grade. The weights are based upon the assumption that they are proportional to the relative importance of the items that are graded. This leads to a contradiction in actual practice. If the spread or range of grading is not substantially uniform, the grades with the largest spread are the most important determinants of the final grade.

There is evidence that very little thought has been given to the implications of the process of averaging grades. It is certain that the traditional grades lead to contradictions when several grades for a student are added up and divided by the number of grades. Such an average is not always consistent with good practice. It has no unique meaning as an index of general ability.

It is easier to understand the nature of this disturbing element by making some specific comparisons. Suppose the grades are expressed in traditional percentages with 80 as average, no grade over 100, and some grades falling below 50. It is understandable that there is a great deal of difference between a trainee whose grades average 95 and a trainee whose grades average 100. However, there is very little difference between the ability of a trainee whose grades average 10 and one whose grades average 15. It would require very little effort to raise an average from 10 to 15, but a tremendous effort to raise a grade average consistently from 95 to 100. This is a fundamental weakness in the system of traditional grades.

It would have no serious consequences as long as the grades would be interpreted in terms of rank and no attempt were made to calculate an average of several grades. But here is the contradiction. In calculating an average, as much difference is reflected between a grade of 10 and 15

as between a grade of 95 and 100. A trainee can raise his grade a very considerable amount by increasing a particular score from 10 to 80, but he cannot increase his average very much by increasing a particular score from 95 to 100. One bad mark may throw a trainee toward the bottom of his class regardless of how outstanding his accomplishment was at other times. Examples could be cited which should make it clear that the process of finding the average grade for a trainee can lead to some very serious contradictions and absurdities.

Incidentally, it is noted that the ordinary logarithmic curve, when used as a factor for converting raw scores, simply exaggerates the fallacy that is prevalent in the ordinary method of averaging.

Objective Versus Subjective Grades

Objectivity is a relative term. All grades on shop performance are subjective to some extent. An approach to objectivity is made by setting up a grade chart listing factors to be considered in determining a grade and the *weight* to be assigned to each factor. Some shops use such charts, and grading by this method is often referred to as the *objective* method.

Charts used in sheet metal listed all the factors to be considered and the number of points allotted to each. Charts used in welding listed each factor to be rated as average, above average, or below average and *weights* were assigned to arrive at a grade based on 100.

The grade chart used for the threaded plate and stud went a step farther. Specific instructions indicated exactly how many points were allowed for definitely stated tolerances and all details were clearly defined. If the instructions were followed carefully, there could be very little disparity in the final grades. The method has practical difficulties. Apparently lack of strict adherence to the instructions accounted for a large part of the errors.

The reliability indexes compare as follows:

	Subjective	*Objective*
Welds	.22	.51
Flanged parts tray	.55	.56
Threaded plates and studs	.26	.61
Cable splices	.93	.76
Fabrics patches	None made	.19

It is probable that there is no difference in the results of the test for flanged parts trays because the instructors had been using the point system grade chart so long that it had conditioned their subjective grades.

The results in the cable splices experiment are surprising but cannot be considered a fair comparison since the splices differed widely in quality.

In general, a grade chart is helpful. However, it does not assure complete reliability in any instance, and is in some instances of no help. Some of the weaknesses in chart grading may be present because it is difficult to get the instructor to follow the chart carefully. However, the only important question is, "Does it work?" Even when the welding procedure was thoroughly standardized not only with respect to a grade chart, but also with respect to other details, the index of reliability was nevertheless zero for test weld No. 1, as shown on Chart No. 3. The only important question again is, "Does it work?"

Effect of Variability of Performance on Reliability of Grades

Two factors have a direct bearing on the ease or difficulty of the grading problems:

a) A complicated work job is easier to grade than a simple work job. If a work job is complicated, experience will show there are wide differences in the quality of these work jobs. In a simple work job, quality of performance will usually be more uniform. On complicated work jobs, there will be many instances where one trainee will perform better than another in any of the details which are given consideration in the quality of the finished product.

b) It becomes more and more difficult to determine an accurate grade for a student as he is approaching the end of this training and becomes more and more proficient. Usually there will be a wider variation in the quality of performance of trainees at the beginning of a course than at the end.

It is always easier to grade trainees on work jobs when there is a wide variation in the performance which is considered in arriving at a grade. As has been stated before, a grade can have no significance except as an indication of rank. In other words, the grade shows whether one trainee is better than another.

There is less variation in quality of simple jobs and less variation in skill of trainees who have become proficient after a period of training.

These statements are proved and illustrated in a comparison of results of reliability tests for grades on cable splices. Two tests were made. On the first hand a number of cable splices were taken at random from the scrap box. They included only samples of practice jobs which were the trainees' first attempts at splicing performance. There were wide differences in the quality of these samples.

Another reliability test was made on a number of samples of cable splices which were made by the trainees at the end of their week's training. By this time the trainees were supposed to have learned how to do the job. Some, of course, did better than others, but all jobs were acceptable.

The results were as follows:

a) Reliability coefficient for grades on practice jobs ..... .99

b) Reliability coefficient for grades on last splices completed .... .48

How to Develop Good Grading Methods

The following eight rules show what should be done in developing a good grading system for shop performance. Our experience indicates that good results may be expected when all of these rules are followed and that a good grading system will seldom be developed if any one of these rules is violated:

1. Express in unambiguous terms the exact final purpose of the shop training and *what the grades should indicate*. Keep the sights on the target.
2. Set up *individual performance tests* and establish definite grading procedures. Take nothing for granted — put grading procedures to a practical test.
3. Try simple grading procedures. Reliable methods generally do not require elaborate and complicated rules to follow.
4. Get rid of traditional grade values. Use a grade scale that does not resemble any in common use. Suggested: Unsatisfactory — Satisfactory — Above Average.
5. Remember that grades are a ranking process.
6. Standardize procedures.
7. Keep checking for reliability[1] until a satisfactory coefficient results.
8. If possible, set up samples for comparison. This is what made the grades reliable in the welding shop.

Outlook for the Future

As stated before, research on grades brought out the following implications:

a) Grading methods are due for a complete revolution.

b) The methods will be simplified.

c) The objective will always be kept in mind.

d) Stress will be on things learned rather than on time spent in a course. Diplomas will be granted on the basis of knowledge and skills rather than on hours spent in classes and shops.

Accurate and valid measurements of training accomplishment have a direct bearing on the entire scope of the educational profession. Prestige and time can be replaced by scientific thinking. Education can become a science and can become efficient as soon as its accomplishment is measurable.

Reliability Coefficient

The reliability coefficient is the coefficient of correlation of the scores of two or more of the same tests given at different times. If the reliability of the test is perfect (allowing for chance variation) exactly similar results should be obtained and the reliability coefficient between the two or more sets of scores will be 1.00.

The increase in the reliability of a test secured by lengthening it or repeating it a number of times in the same form may be computed from the Spearman-Brown formula:

$$r_n = \frac{nr_{11}}{1 - (n-1)r_{11}}$$

Where r_n = the increased reliability coefficient resulting from either increasing the length of the test in "n" times or repeating it "n" times.

r_{11} = the coefficient of reliability for the original test.

[1] See "Reliability Coefficient" at end of this article.

Guidance, Counseling, Training, and Placement

*Col. Edward A. Fitzpatrick**

One of the main problems in the readjustment of the veteran returning home and of the warworker returning to normal occupation will be adequate and intelligent organized services for vocational guidance and counsel for re-employment training and refresher courses and for their placement in either their prewar job or a new one. It is in the social interest that the general facilities set up for the demobilized veterans should be available to the discharged warworkers. This may reasonably be done in view of the fact that a large number of these vocational guidance services will be the normal social service and educational functions of our public school system, of higher educational institutions, including professional and technical schools, and of all agencies of adult education and of industry.

The Number of Federal Agencies

One of the confusing factors in the present situation in the past has been the number of federal agencies that are presumably dealing with this problem. They include Selective Service System, the Veterans Section of the United States Employment Service, the Veterans Administration, and the Office of Vocational Rehabilitation of the Federal Security Agency. At the moment the main responsibility seems to be placed by law on the Selective Service System. There is also legal basis for the placement work of Veterans by the United States Employment Service. The Veterans Administration has its functions, too, particularly with the handicapped. The wartime competition for increased power is likely to continue in this confused situation in the postwar world, at least during the transition period.

The Retraining and Re-employment Administration

Steps have been taken to avoid this struggle for power and conflict of authority through co-ordination. This was the object of the Retraining and Re-employment Administration created by Executive Order 9427. This Administration will have supervision and direction of all activities of the government relating to retraining and re-employment services. More specifically its functions will be:

In consultation with the government agencies concerned, to develop programs for the orderly absorption into other employment of persons discharged or released from the armed services or other war work, including adequate provisions for vocational training, for the finding of jobs for persons so discharged or released, for assisting those persons and their families pending their absorption into employment, and for dealing with the problems connected with the release of workers from industries not readily convertible to peacetime use.

*National Headquarters, Selective Service System, Washington, D. C.

A Problem of Adult Education

There is the problem of the return of the younger veteran to educational institutions for the continuance or the beginning anew of their general education. This problem is treated elsewhere. At this point we are concerned with the problem of vocational adjustment or redirection of the returned veteran. This is primarily a problem of adult education and will use the special instrumentalities already established and will very likely require adaptations of existing educational machinery such as Yale University has already undertaken in its new Institute of Collegiate Study for Ex-Service Men. The war experience should benefit the postwar vocational readjustment of veterans. The plans in this field as outlined in the International Labor Office should insure the following things:

1. That enough training is available
2. That it is suitable for adult workers
3. That it is directed toward actual or prospective employment openings
4. That high enough training wages or allowances are paid
5. That war experience of training is taken into full account
6. That the program as a whole is closely linked with the guidance and placement work of the employment services (International Labor Office, Manpower Mobilization for Peace, Montreal, 1943, p. 48).

The Problems Are in Local Communities

It should be noted in the first place that the problems are individual problems in local communities. It consists in facilitating the readjustment of the individual into the environment which he left or into a new environment into which he wishes to go. It consists of an individual adjustment in a particular community. The instrumentalities for rendering this service are essentially local instrumentalities. The difficulty with the multiplicity of federal agencies is that the treatment is likely to be standardized and impersonal. Moreover in a great many of the cases except for handicapped veterans there is no need for federal oversight or control because communities must render these services as a part of their normal educational services. The actual problem has been very well stated, as follows:

The locus of the problem of human readjustment from a war to a peace situation is the American community — rural, small town, or city. Its cause is a national emergency, but its solution must be worked out in the individual's home community. There must be national aid in the form of money and there must be nation-wide resources of occupational information made available, but the readjustment of individual men and women to normal peacetime conditions must depend upon the utilization of local institutions and agencies, administered as far as possible by those who are acquainted with the individual in his social, economic, and domestic background, and with his vocational opportunities. (Institute of Adult Education: Report of the Commission on Post-War Training and Adjustment, 1942, p. 13.)

Professional Personnel Needed

It should be noted that this vocational guidance, training and placement service is not a matter for volunteer workers nor for chambers of commerce or persons of good will merely. It is a professional service. It should be rendered by professional personnel. This is ordinarily found in the local community in connection with the regular school system and the system of vocational schools and the higher institutions of learning in the community. For this guidance aspect and counseling the federal agencies are not especially equipped. This applies to all of them.

The United States Employment Service

The point of view that a professional service is absolutely indispensable makes inappropriate the suggestion that the U. S. Employment Service should carry this whole burden. The example of the Employment Exchanges of Britain is not applicable to the character, legal position, or functions of the U. S. Employment Service. Most of the men in the service will recall the U. S. Employment Service of W.P.A. days, and the restricted scope of its work. In some states its distinctly political character will be in their minds. In the war, unlike British experience, it did not have the far-reaching duties of its British prototype.[1] It was never integrated into a national organization, it was inadequately financed, its own labor turnover was over 100 per cent and it was sustained during the war by artificial support of administrative regulations. Whether the employment service is returned to the States or not, it will need to be strengthened and more adequately financed even to furnish its service as a "labor market." It must not be forgotten that the largest number of persons are engaged directly by the employer, so that will naturally restrict its placement sphere.

The function of an employment service

[1]The following description of British experience shows how far the experience of the U. S. Employment Service differs from the British war experience. Consequently, proposals satisfactory for their employment exchanges are not necessarily satisfactory for us:

"The employment offices have handled military and industrial description. They have been responsible for inspecting factories to see that all workers were being used as efficiently as possible. They have taken on the task of supervising the welfare of hundreds of thousands of transferred workers. Training has been brought closer to placement work. The employment machinery has played an important part in deciding where contracts should be placed and where new factories or plant capacity should be placed. The local, district, and regional employment offices have become a central part of the whole machinery of war organization." (International Labor Office, Manpower Mobilization for Peace, Montreal, 1943.)

in the program and a counseling service must be constantly kept in mind. The one is primarily an economic or industrial service, the other is an educational one. The one keeps its eye on the individual, the other on the job. The one is concerned with an immediate situation, the other with the permanent welfare of the individual. These points are emphasized in a statement of the Institute of Adult Education at Columbia University as follows:

The counseling service organized under the auspices of the schools must work in closest cooperation with the public employment office and with other nonprofit placement services in the community. Because vocational adjustment is so fundamental and so frequently a point of incidence of any counseling service, the suggestion is often naturally made that an adult counseling service should be a part of the U. S. Employment Service. There are reasons against this plan. The fundamental social service which the employment office undertakes to provide is the creation of a labor market, and its "center of gravity," so to speak, is the task of selecting the best man for a given job. The school, as an educational agency, focuses on an individual and his growth and development. Counseling which is concerned with the individual and his adjustment is an educational process and, therefore, a part of the school's function.

The Selective Service System

It is apparently the plan of the Selective Service System in fulfilling its legal obligations to direct the men to the agencies that can render to each individual the service he needs. It seemingly will not in present plans attempt to render the professional services. It is the functions of the re-employment committeemen which have been appointed in each of the local board areas to furnish a human contact of the individual with his home community. They are symbols of the friendliness and co-operation of the community. They do not pretend to render a professional service and for the most part merely facilitate the individual's contact with the agency that can render him the particular service he apparently needs. Moreover his operating center is the local board which will probably be in existence during the transitional period or at least for a great part of it. He is a volunteer worker and his work will be most important in the early stages of the transitional period. In its later stages the agencies of counseling and guidance and training and placement will be so well established that the veteran or discharged warworker will be able to make direct contact with the counseling, guidance, training, and placement agencies.

The Armed Service Participation

The discharge of the men in the armed forces is primarily, yes, solely a function of the armed forces. The organization of the necessary kind of work at the ports of debarkation and the points of actual demobilization will be necessarily functions of the armed services. This program might well begin and should begin in the armed forces themselves before discharge under the direction of the special services officers and the chaplain. It would be continued at ports of debarkation and at all centers where the process of demobilization is facilitated. At these ports and these centers, vocational and educational guidance and industrial and job information services should be available. Naturally similar services will be available at the journey's end in the local community. The important thing is that such informational and guidance facilities should be available and easily accessible. The approach to the individual will be entirely educational, personal, and co-operative. The objective will be to assist and help, not to direct and prescribe. The decision should be made by the individual himself.

Guidance for Agricultural Workers

Approximately one half of the men who entered the armed services come from rural areas more or less directly a part of the agricultural industry. Service for these men who are returning to agricultural pursuits or of industrial workers who now decide to change their occupation to agriculture should have the benefit of a professional personnel of special qualifications in the field of agriculture. It will not do to treat agricultural counseling as incidental to the industrial counseling nor will it be the simple problem of furnishing farm hands. This requirement of a special service is essential because of the special problems which agriculture presents. It is important, too, because of what has been called "a cardinal principle of our national economy, namely, that agriculture should not be looked upon as the dumping ground for the industrial unemployed or the industrial restless." The methods of guidance, the organization set up, the kind of information needed, should all take into account the differentials between industry and agriculture. This will naturally find expression best in the terminus of the discharged veteran's travel — that is, to his local community. It is likely to be overlooked at guidance centers at debarkation points and at intermediate demobilization centers as well as in whatever is attempted in the period prior to embarkation. For those in this country the problem should be simpler than for those who are abroad because of the availability of the organized educational and economic machinery.

Guidance for Women Workers

There will be a considerable number of women in the armed forces to be released and, of course, there will be greater numbers of those in war industries. While to some extent the general facilities will be as useful for men and women, the differentials regarding them and the changing situation with reference to women in industry will require special counselors for women in industry. Industry itself in view of the new situation which the war has created will undoubtedly establish a special division in its personnel department for the selection, care, and training of women workers. While undoubtedly a great number of women engaged in war industries as a patriotic service will return to private life and leave the labor force permanently, many of them will wish to stay. Industry's experience with them during the war will stimulate the desire of industry to hold and keep them and to be receptive toward their employment in converted industry. This is another service that will be especially important in the transition if the resumption of peacetime economy is going to be done intelligently and with the best permanent results for our social and economic order.

The Job is Not Merely Placement

The work in each community should never get to be on the level of mere placement of an individual in a job whether it is his old job or a new one. Many individuals will naturally make their own arrangements and go directly to their old employer or because of the training they received in the army or navy seek new employment in the light of their present outlooks and additional training. Industry itself will have many plans for the provision of veteran workers. Personnel departments will be geared especially for this type of work. This will tend to reduce the work of the U. S. Employment Service which is likely to regard the job primarily in its placement aspects.

Information Regarding Veterans

The Adjutant-General's form containing the information regarding the individual with his military experience directs the veteran to go to his local board. The discharge from the navy has certain information on its reverse side regarding the individual. The local board files especially the questionnaire and the industrial questionnaire, which is also on file at the U. S. Employment Service Office contain additional information. Because of the confidential information in the files of the Local Boards, they cannot be made available generally, but most of the information may be disclosed or furnished. It may be wise to disregard this information because it is out of date or not helpful to the individual.

The Local Board as a Local Agency

If the time between the cessation of hostilities and the declaration of peace is so long that local boards have gone out of existence it is imperative that some local office should be maintained for a period extending to six months beyond the termination of the war or declaration of peace for discharged veterans to make the necessary contact. The responsibility of this part of the program should fall mainly on the local educational institutions and particularly on the adult education facilities. This phase of the program must be regarded as an important part of the human aspect of demobilization. Its primary point of view should be education. Each concern should be with the maximum utilization of whatever skills the individual has and the possibilities of growth in the job. The guidance will not neglect the possibilities of further training while employed as well as the guidance of these individuals into full educational activities.

Industrial Arts and Vocational Education in the Postwar Period*

*L. H. Lamb***

In order to get some concept of the relationship between industrial arts and trade and industrial education in the postwar period, we need to review briefly the previous relationship and functions of these different types of schools. Most of us have either observed or heard of the old type of manual training. Without taking too much time in discussion, this work was generally aptly named, and was primarily a course or series of courses designed to keep boys busy with their hands. Obviously, the problem cases and the low mental cases were most often assigned to these classes because it seemed to be the one place where they could be put and cause the least trouble. Industrial arts, on the other hand, as it is known now, are carefully prepared courses of study, which not only train boys in the skill of the use of machines and tools, but which give them fine concepts of the principles of mechanics, the science of materials, and of production. In reality, I believe the modern industrial-arts courses of study provide for more science, social science, mathematics, art and industrial concepts than they actually provide for manual skills. This is exactly as it should be, because the industrial-arts course of today is an actual study, not just an activity. These classes are no longer dumping places for problem boys or the mentally retarded. It takes as much intelligence to understand modern industry and production and the sciences related to it as it takes to understand Latin or any of the other academic subjects.

Vocational schools, trade schools, and industrial schools have gone through the same type of experiences as has industrial arts. In the early stages these schools were generally considered by educators and the public as being dumping grounds for problem boys and the mentally retarded. This is no longer the case. Naturally, we have classes for mentally retarded, but we no longer expect that they will make any more progress in the development of understanding of mechanics or in the development of specialized skills than they would make in a class in English. Vocational schools have developed into institutions requiring intelligence and understanding and skills. They develop primarily from the industrial-arts courses in that they are much more intensified and less general in nature, and that is exactly as it should be, because the trade, industrial, and vocational schools have as their function the job of training for a specific occupation such as machine shop, the electrical trade, patternmaking, and the like. It is rightly assumed that when boys complete these courses they are ready for industry.

Industrial arts is, therefore, no longer the "dumb boy" of education. Industrial-arts teachers are carefully trained in the academic subjects, in the sciences, in the social sciences, and in the arts, as well as in mechanics. Not so many years ago it was assumed that industrial-arts teachers knew little about academic work, and more than one school administrator has been surprised on careful investigation, to find that academic work was being taught most successfully in the industrial-arts courses. Of course, industrial arts cannot be taught properly without adequate science, mathematics, art, etc., and for many boys the motivation found in shopwork is the very thing that they needed most to arouse their interest and understanding of the arts and sciences.

America is no longer a predominately agricultural nation. It is the most highly industrialized nation in the world, and progress in scientific and industrial developments are coming with bewildering rapidity. This present war unquestionably will stimulate progress in scientific industrial production such as the world has never seen. Because of this great scientific development, industrial leaders are demanding educated employees. The surprising thing is that they are not asking for a narrow education in our high schools, but they are demanding that a part of our general high school training shall be in industrial arts, and that these industrial-arts courses shall give broad general training in science, in mathematics, in the arts, and in mechanics. They definitely do not want industrial-arts courses to attempt to develop specialized skills. They believe that these specialized skills should be left to the industrial, trade, and vocational schools. It is quite logical that general training should precede specialized training and specialized training precede employment. Because of the highly developed specialization in industry today, industry must assign men to specific jobs of quite a narrow nature and keep them on that job. It has been my experience as director of personnel and labor relations in industry, that because of this high specialization and because of the lack of adequate previous general training, men in these specialized fields in industry often could not be transferred from one job to another when one slackened up. For example, when the firm with which I am connected had a sharp reduction in the need for plane grinders, many of these men had had no training or experience except in plane grinding and could not be transferred to other highly specialized jobs. Had these same men had industrial-arts, trade, or industrial school courses, their transfer could have been made to other departments at little cost to themselves or to the industry. Now that industry is becoming increasingly aware of its personnel problems and the human element which must be given attention, they are increasingly demanding industrial-arts training in the high schools and specialized training in industrial, trade, and vocational schools. This demand is good for business, but it is also good for the worker, for it gives him a broad background so that he can shift with a minimum of training as production requirements shift.

As late as 1928, certain General Motors plants informed me that they very much preferred to hire young men who had not graduated from high school and who had not had industrial arts. It was their opinion that these young men were spoiled by education. By 1935 this attitude was changing to the extent that industry was beginning to take high school graduates where they had industrial-arts training, and to accept the recommendations of the instructors along with the high school record of the boy, including the record in industrial arts. When the great production change came as a result of the war effort, these General Motors plants promptly requested high school graduates who had had industrial arts and employed them on the basis of their records, giving preference to these boys. We found out within a short time that boys out of high school not more than eight months or a year were being made straw bosses and foremen, and when we protested because we felt it might harm the cause of industrial arts we were informed that industry, through its rapid expansion, had to have leaders, and that because of their training these boys were better qualified because they had a broader background of understanding than the average worker. In other words, industry is learning more and more that high school training is valuable and that industrial arts is an essential part of that training for boys entering industry. Even during the period of rapid expansion of employment, industry has asked for the academic, citizenship, and shop records of these boys and has given definite preference to those with the best records. We have found the same experience to be true relative to boys having taken drafting in school — they have been in demand for mechanical drafting in industry and architectural

*Address presented at a meeting of the Wisconsin Industrial Arts Association and Secondary School Principals, Milwaukee, Wis., on November 2, 1944.

** Superintendent of Schools, Manitowoc, Wis.

drafting in the building trades. The need for training in electricity, radio work, and the like, is so obvious that further comment is unnecessary.

Any superintendent, principal, or placement officer who has paid any attention to the things high school graduates do after graduation realizes that 25 per cent is a high percentage for the number of graduates who go on to college. They realize, too, that in most of our cities, and increasingly in the smaller towns, our high school graduates are drifting into industry, simply because industry is affording the great opportunities in employment. Regardless of the type of work these young people get in industry, a training in mechanical and scientific understanding makes them more valuable to industry and business, and therefore, more valuable to themselves. There is no question, industry is recognizing the need for education and for the technical and mechanical training offered in education.

In our city we have a very fine high school that unfortunately has no shop training. Not many years ago the people were asked to vote on the addition of shops and it was turned down by the voters. Labor manifested no open support, and from what I am told, many of them were opposed. A few weeks ago I received a resolution from our Labor Council, a copy of which was sent to the City Council and the local paper urging that shops be constructed. This resolution pointed out that the present war has definitely demonstrated that the boy without shop training has been handicapped during this present war. I think all of us realize that that is unquestionably so. Certainly none of us would question that our powerful army and navy have been mechanized, and that mechanical comprehension and skill is essential to successful war. Neither can we question the very rapid mechanization of farm work. Just recently I heard a radio talk by one of the big farmers of the country who said that he would put as one of the first requisites for the young man going into farming today, a training in farm mechanics.

It seems obvious, therefore, that there is an increasing need for industrial arts, for trade, industrial and vocational schools, and that the country is recognizing this need. It seems obvious that there is no conflict between these types of schools and courses, that industrial arts will be increasingly a prerequisite for trade and industrial training, that there will be mutual respect and dependence on each other, that the trade and industrial schools will ask for the records of students in industrial arts, and that there will undoubtedly be joint planning and joint research by instructors in industrial arts and vocational and trade and industrial education. The wise school administrator today, whether he be in an agricultural community or an industrial community, will plan on the most modern industrial-arts courses in the high schools and will urge co-operation between high schools and vocational, trade, and industrial schools. In closing, it is perhaps well for us to point out that high school students planning on a college career should by no means be excluded from industrial-arts courses. So many of these people who go on to college will be taking work leading to employment where they will definitely benefit by the technical and mechanical training they will receive in such courses.

The School Handbook and Mechanical Drawing

*R. R. Bedker**

When Mr. Daley, sponsor of the school handbook, published annually at the Wauwatosa High School, Wauwatosa, Wis., asked the mechanical drawing department to make floor plan layouts of the school for the new printed handbook we gladly said "yes." Generally the drafting room accepts any reasonable request for work providing it fits into the general educational plan and is not in too much of a *rush*.

Applied mechanical drawing tends to do the following for the student:

1. It gives him useful, purposeful work.
2. It promotes pride in work.
3. It provides a chance for making exhibition pieces.
4. It gives a chance to gain some recognition.
5. It emphasizes accuracy.

The first thing we did in meeting the floor-plan problem was to present or *sell* it to one drawing class. Then we asked for nine volunteers because it would take some out of school time. Twelve persons volunteered and we had a special meeting with this group. One member was appointed to interview Mr. Daley to get detailed facts regarding the size of the handbook and the size of the drawings. The other members selected the section of the school to sketch and draw. We also looked over other handbooks to get ideas.

One member was selected to do the Wrico lettering. This person had to read about and practice Wrico lettering. We experimented with the size of lettering so that at the reduced scale it would be readable. The lettering and lines were checked with a reducing glass. After the page size and the final reduced drawing size were determined we enlarged the rectangle to get the correct proportion for the original drawing by using the method shown in Figure 1.

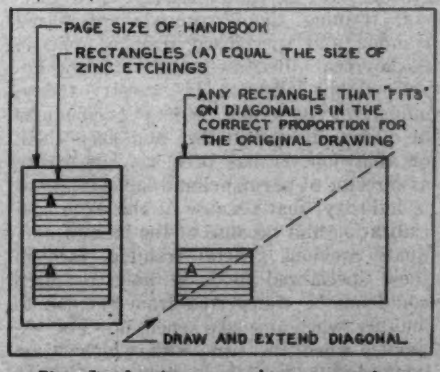

PAGE SIZE OF HANDBOOK
RECTANGLES (A) EQUAL THE SIZE OF ZINC ETCHINGS
ANY RECTANGLE THAT "FITS" ON DIAGONAL IS IN THE CORRECT PROPORTION FOR THE ORIGINAL DRAWING
A
A
A
DRAW AND EXTEND DIAGONAL

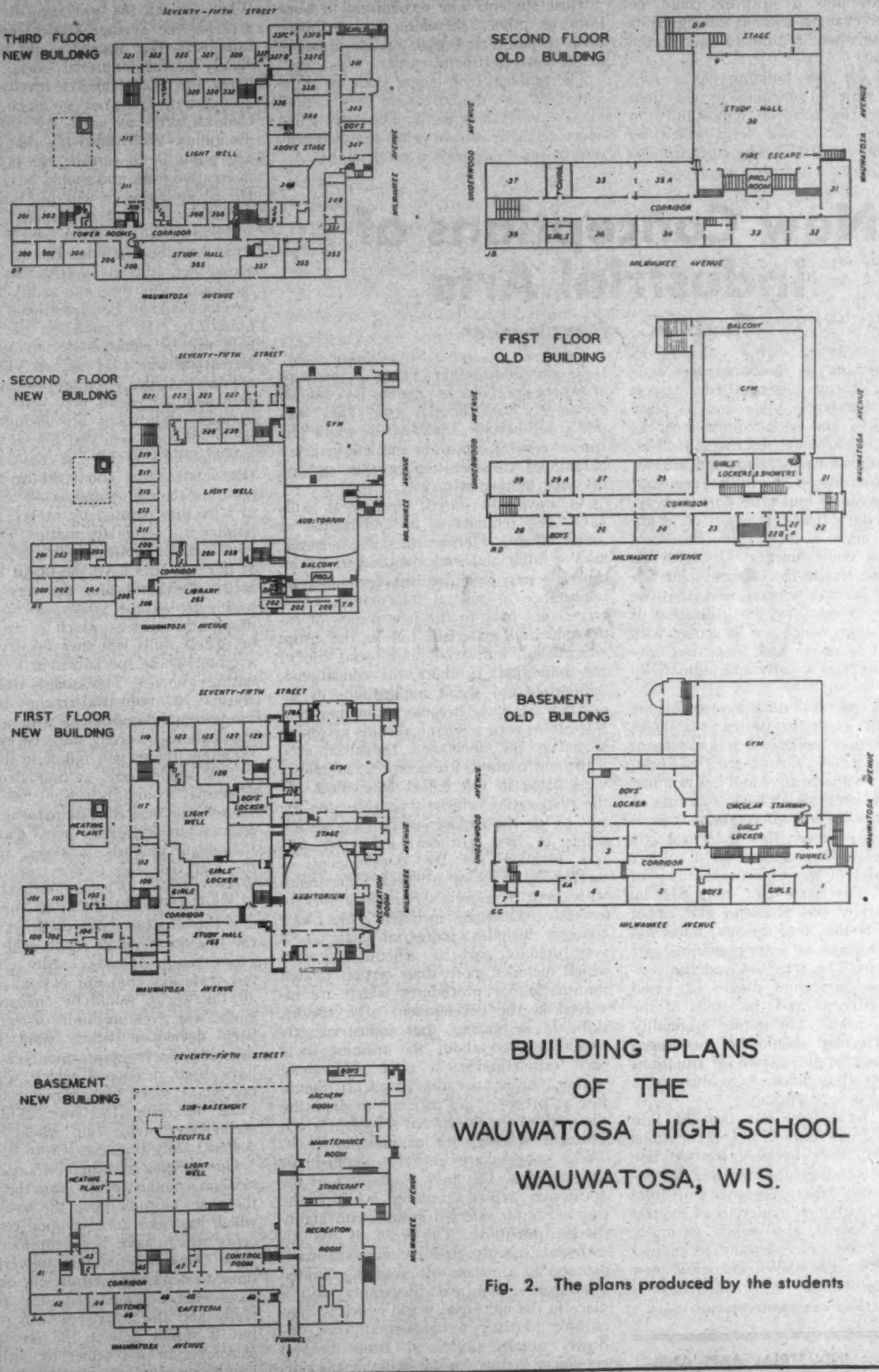
Fig. 1. Laying out the proportion to which the original drawings were to be made

The length of the original drawings was then made three times the length of the reduced layout. In the drawings for the new part of our school we made use of two scales to get best results. We had plenty of room for the length but needed space for the width. The corridors, light well, and auditorium were condensed some without doing any harm to the usefulness of the drawing. Our two buildings, connected with a tunnel under the street, made a unique problem in locating all doors, stairways, corridors, and rooms. For clarity, we decided to make a single line drawing, to omit up or down on stairways, to omit doors, and omit repetition of the word *corridor* and other things of that kind.

The other boys went about the buildings to make sketches and from the sketches they made the original inked drawing for the zinc etching. One boy was appointed to set up the standard as to size of floor plan, width of inked line, and the size of title and other lettering.

The drawings were penciled in, checked, and placed on the bulletin board for general inspection by class members. It was found that some members of the class are very alert and they found omissions and made suggestions for corrections. All room numbers were checked with the main office and some rooms were renumbered or had to be given new numbers. The finished drawings were checked by the building custodian, principal, sponsor teacher, and

*Wauwatosa High School, Wauwatosa, Wis.



BUILDING PLANS OF THE WAUWATOSA HIGH SCHOOL WAUWATOSA, WIS.

Fig. 2. The plans produced by the students

the boy in charge of the project. The boys were shown how a drawing could be *patched* for changes without damaging its effectiveness when it came to making the zinc etching.

Part of the new building has a sub-basement with an opening in the floor which gave the boys an opportunity to look around for a new term which we finally called "scuttle." The students also had a chance to draw a circular stairway.

Most students like recognition in some form or other; therefore, we permitted them to put their initials on the drawings in the lower left-hand corner.

The problem took longer than we anticipated because the boys were very anxious to have everything right. The satisfaction of seeing their work in print was their only reward for doing such a good job.

New Conceptions of Industrial Arts

*Towne R. Abercrombie**

The treatment of industrial arts as a part of our scheme of general education is becoming abundantly plain and its place in the school and social order must be recognized. The phases of the industrial-arts program, as it now exists, and the new phases or concepts of the future, are playing an increasingly important part in every-day life of our citizens. It is not necessary to embark on a comprehensive survey of the past accomplishments — it is necessary that we realize the enormous interest which has been developed, and that we further this interest by the utilization of new conceptions which are in accord with the pattern of progressive living not only educationally, but socially and industrially as well.

The progress of industrial arts in the past, as well as in the future, is a direct result of certain tendencies and influences without the school. The progress has been liberal and comprehensive and has retained certain fundamentals or basic concepts of mechanical skills and information. It is to be regretted, however, that industrial arts has, in the past, progressed as a subject not as a part of the whole curriculum of the school. This same fault may well be applied to any one phase of the school program. In the new concept industrial arts will progress as a very definite part of the whole. The activities and the content of the curriculum should be based upon the interests and the needs of the pupils *as a whole*. The pupils' originality and inventiveness should be encouraged through real applications to situations which affect their lives. A mastery of a single phase is not sufficient.

Modern technology has brought into existence a great range of new occupations which are midway between the old line skilled trades and professions, and the so-called common labor. There is a definite tendency toward new materials of expression in industrial arts which naturally necessitates new processes and techniques and a consequent development of new skills and information. The new mediums of expression, however, cannot be confined exclusively to industrial arts. They naturally will become a part of the whole picture of general education and will be given paramount consideration in the sciences, the arts, mathematics, etc.

As previously stated, mechanical skills have been retained as a fundamental in industrial arts. Mechanical skills, however, as a definite and exclusive feature of industrial arts have become secondary in importance to general information which relates not only to the new means of expression and materials, but to the entire educational, industrial, and social life of the individual. In short, the educational, industrial, and social implications of industrial arts have become paramount considerations with mechanical skills becoming secondary in importance. Industrial arts, if the new concepts are accepted, assumes a vital place in the school curriculum for the preparation which it provides for the sort of life the children of our schools are going to live. Hitherto industrial arts was planned for the development of mechanical skills or technical competence with limited aspects or implications of general education included. The new concept includes industrial arts as a very definite part of general education which includes more than certain related information or procedures which are involved in the development of a specific skill. It is obvious that industrial arts should not go about the training of a poor cabinetmaker, a poor sheet-metal worker nor a poor draftsman. It should just as precisely not attempt to duplicate the work of the vocational schools, the adjustment schools, nor of industry itself. These courses are entirely planned for the specialist. The basic assumption of the vocational school training is that the training is for selected groups with highly specific intentions. The work of the adjustment schools stresses technical competence as a means of providing limited minds or school maladjustments with a place in the industrial world which is comparable to their recognized abilities. Industry usually prefers to train its own personnel in the specific skills of the particular trade.

All of the foregoing brings up a question. What should the program of industrial arts for the average student seek to accomplish? The answer would be to look closely at the industrial, social, and economic life of the children involved in such a program. It is not so much with mechanical skills as such, nor with specific disciplines and traditions, that the average pupil is concerned. He is interested in creative work and should be encouraged. He is, and always will be, interested in current social and educational, economic and industrial problems which will challenge our best minds. He must become acquainted with the world that is in the making at this time and at all times. The development of the traditional skills required for the completion of a specific task will be enhanced by the general information which is utilized. The act of making a table, a scratch awl, a drawing, or a painting means very little unless the various implications are included in the whole picture and the several skills are developed to round out the instruction. One learns more about art by copying a painting than by standing off and looking at a picture painted by others. Skill as a painter is a secondary matter. The general education and understanding is paramount. If boys or girls have the talent to become artists they will find the ways and the means to become artists. They will then deal with specifics which is as it should be. Their skills will then be developed in a group where specialization is the dominating influence. The same is true of other features of industrial-arts projects. The fundamental conditions, with all of the implications involved, must be met first — the other things will follow in due course.

This would seem, at first glance, to be somewhat remote from what has been considered practical educational concerns with relation to industrial arts. Careful and thoughtful analysis, however, will reveal the fact that this is not true. Industrial arts, as a part of general education, must transfer itself with all of its ramifications into life situations. We do not know what the life situations of pupils will be a few years hence. It was hardly conceivable ten years ago that our nation, as well as all the world, would be engaged in this global war. New mediums of warfare have been developed which were not even dreamed of a few years ago. New materials have been developed which will change our whole social and economic life in the years following the war. Will modern technology revise our whole industrial system? Only time can tell.

Our schools continue to organize curriculum committees to plan the work for the years to come upon the basis of work which has been done or upon certain concepts which have been considered to be basic. Our colleges and our universities continue to depict graphically the things that have been accomplished. The courses of study and the graphs serve a purpose — but it would require the services of an astrologer or a prophet to outline or to graph our future procedures. One thing

(Continued on page 244)

*Washington Junior High School, Cincinnati, Ohio.

Industrial Arts and Vocational Education

John J. Metz, Editor

SOMETHING TO OCCUPY THOSE SPARE MOMENTS

The war in Europe, happily has come to a victorious close, and it is hoped, the Japanese war also will terminate shortly. With this as a starting point, it may be well for the school shop instructor to look about his shop with an eye to what must be done to improve the work that he is doing in the fields of industrial arts and vocational education, after World War II has been finished.

Postwar planning for the school shop need not mean anything drastic, if the work in the past was good. But no matter how excellent it may have been, it is still necessary to do some serious planning before the glorious time, when the world can once more take up the pursuits of peace, is again with us.

There may, of course, be some school shops where there is no need for new equipment, but there are few such shops. The thing to do then is to use part of the summer vacation to make a list of the things that are needed. It may be well to indicate on the various items whether any preference exists between them as to the time of acquiring them. For instance, the shop may need several new lathes, a grinder, a shaper, and a milling machine. The instructor, however, may need one or more of these machine tools more than the others, and would prefer to have certain ones ordered if he could not get an order for all of them. It is well, then, to indicate these choices on his master list, so that he can readily change his requisition if such changes must be made.

Since this is really an important historical transition period, it may be well also to do some serious thinking about making a complete new layout of your school shop. You may have taught in that shop for a number of years, and you may have frequently said "If I had to do it over again I would . . . ." Well, now is the time to do it, at least on paper.

And then there is the question of the projects which may have been used as standard for several years or more. It might be time to adopt new ones or revamp the old ones so that both you and your students will have something fresh and interesting to do. During the past few years it was difficult at times to get materials. We are drawing nearer to the time when a great variety of things will again be available. Have you thought about what you would like to adopt? Some items made of these newer products may be easily incorporated into your present course. It is worth while thinking about this phase of your shopwork.

Then there are such other important things as: a good set of objectives which ought to be prominently displayed in the room, an outline of instruction which should occupy an important place where students and visitors can see it and read it, instruction sheets which cover both the practical as well as the related subjects matter of the course or courses, and a progress chart which the student may consult as a guide and a self-appraising device of his own personal growth.

Lastly, have you as many visual aids as you need to teach your subject matter as efficiently as possible? The training courses used by our armed forces have shown how well visual aids may be used under varying circumstances. The value of these aids has been well known to many of our shop teachers, but never could the individual instructor have access to such a large variety of well-prepared material as now. Have you drawn up your suggestions for what ought to be put into your classroom?

Probably all your planning, your analyzing, your lists of available equipment and material will in the end give you little, because your superiors may turn down your requests. Do not let this cause you any worries. Your thoughtful labor will not have been wasted. At some time, that very same planning may be the main reason for being able to accept a bigger, better, and more self-satisfying position in a school system that will recognize your real value.

FOR INSTRUCTORS OF REHABILITATION CLASSES

Recently the U. S. Office of Education, Washington, D. C., published a little 32-page booklet entitled "Open Letter to My Newly Blinded Friend." The book is written by Joseph F. Clunk, chief, Services for the Blind in the Office of Vocational Rehabilitation, who himself is blind, and who for that reason can speak authoritatively to others similarly afflicted.

The book is filled with a philosophy of hope and cheer which will assist the newly blinded, of whom only too many will return from the various fighting fronts, to overcome their first poignant despair.

The author gives his advice in such a matter-of-fact way that his words cannot help but buoy up the spirits of one who has just lost the use of his eyes.

Books of this kind are all too rare. Instructors, even if they do not teach the blind, should read this book. It points out the way for those who want to write similar books for persons who have other disabilities than blindness.

THIS MATTER OF TESTING

The end of the school year brings up the question of testing, grades, and class transfers. There are still many shop teachers who feel that they can judge the work of their students without any semester-end tests or examinations. Such subjective methods have been proved absolutely undependable.

Even carefully prepared checking systems have not proved as reliable as their originators thought. To prove this read the description of the study made by Comdr. C. C. Caveny, USNR, and Lt. J. A. Weichelt, USNR, which appears on page 233 of this issue under the title "Reliability of Shop Grades." Another article entitled "Testing Procedure" by O. L. Young, on page 254, gives some thought-provoking suggestions.

The failure of the tests that have been used should not discourage anyone from going ahead and trying to improve his own testing method. Nothing will be gained if the teacher decides that he will discard all of his testing, because present testing methods are not perfect.

It is true that we have not enough standardized performance tests for our shopwork. We do, however, have numerous written achievement tests, many of them standardized, which have proved quite reliable. Such tests, then, can be used with fair dependence that they do show, at least to some degree, what the student has learned in his shop classes. It is well then to make the best use of what we have now, and then strive to improve our methods and our tests, both the performance and the written achievement types, to the end that our industrial arts and vocational educational work will become increasingly more perfect.

(Continued from page 242)

can be done, however, and that is to promote an industrial, educational, and economic initiative which will be able to function when the unforeseeable exigencies and challenges arise.

The new conception of industrial arts must be more than a simple plan of integration of subject material. It must mean a group, or number of groups, moving along the same line and following a similar policy. In short, it must be a part of general education not a specific thing or unit of instruction which is set apart and termed a "special subject." It is said, and properly so, that it is easier to bring industrial arts into a close relationship with what are termed the academic subjects than to bring the various phases of a complete industrial-arts program into relation with one another. The reason for this is, that subject material such as social science provides a framework for relationship. In many instances there is no framework of connection between the various phases of an industrial-arts program. For example, there seems to be little opportunity for integration between welding and cabinetmaking. There is a world of opportunity for integration between welding and science, between cabinetmaking and mathematics, etc. It is true that there can be no integration between incompatibles but it is equally true that there can be a close integration when a common foundation of policy toward an intelligent and tangible aim is established.

Industrial arts has kept itself aloof, so to speak, from the general school program. No subject can be set aside as a "special subject" and still maintain its rightful place in a closely integrated curriculum. Industrial arts must make itself felt as one of the most important subjects in the complete education of the average pupil. Why should it not be felt? It is difficult to imagine life situations where a knowledge of some phase of the arts does not play an important part. This does not necessarily mean experience in the life of boys, it also applies to girls. From the time the businessman or the worker leaves his home in the morning in the family car until he arrives home in the evening he is in constant contact with some form of the arts. Why should he not be familiar with the basic aspects of the arts? The housewife is constantly in touch with the arts from arising until the day's work is completed. Neither the man of the house nor the housewife think in terms of industrial, of social studies, or science, of mathematics or of English exclusively. To thoroughly understand the principles involved in their daily contacts there must be a general knowledge of all aspects of science, mathematics, etc., and their relationship with industrial arts.

How can this close integration be developed? First, by removing industrial arts from its "special" pedestal and making it a part of the whole. Second, the studio-laboratory setup which affords varied opportunities for actual participation in the various arts and the general subjects. This means that the former industrial-arts shop must become much more than the name implies. It must broaden its activities and become central in the life of the student. The usual terminology of the shop must give way to a general terminology which involves the academic and the industrial. The laboratory must be made available to large numbers of students for actual participation in the activities. The diffused participation on the part of many of both sexes should be one of the main emphases of the whole program.

It has been stated earlier in this article that skill in any one phase of the arts should be secondary in importance to general information. This will bear repeating. It will also be well to repeat that we do not want to train poor mechanics in any line of endeavor. We do need to train *good* draftsmen, *good* machinists, *good* woodworkers, and *good* electricians. If this is not done, the program will lack something of great value. Too often, however, this is done at too great a cost. What should be done is to organize the work so that it will have significance and appeal for everybody, a broad and inclusive foundation and then build our edifice or structure as high as we can. Provide the necessary training which will lead to technical competence in tool manipulation, but also provide the training or the opportunities which will lead to competence in computation (mathematics), representation (drafting), analysis (English), science (science), terminology (spelling), and in commerce and industry (social science). Skill in any one field, mechanical or otherwise, is secondary. Only a skill which is complete in all of its ramifications is essential and meaningful.

The essence of the above may be simply expressed — co-operation. Perhaps that is a better word than integration. Certainly without co-operation there can be no integration. There must be a common aim — not a series of aims which strive to offset one another. This co-operation must come from the teacher, the administrator, the board of education, and the public to be effective.

A still more important aspect, however, with deeper implications than the above, is the co-operation of the student body as a whole. Integration takes place, not in a course of study for a particular subject nor in a curriculum as a whole, but in a pupil. The influences of industrial arts, of English, of science, and of all subjects must be consistent if the new conception of industrial arts is to supplant the old conceptions. We must create and develop opportunity for integration and broad conceptions rather than rest on a certain security which has been firmly established in the past. New times demand new techniques. We must have less of machine shop and English, less of electricity and mathematics, and more and more of life and the situations of life. We must analyze new mediums and new methods and find their implications, not only in one subject but in all subjects, and then develop our skills in the mastery of the whole.

Visual Aids on Teaching Techniques

*Lt. (jg.) H. C. Rose, U.S.N.R.**
*Lt. (jg.) M. B. Callahan, U.S.N.R.***
*Lt. (jg.) P. W. Wilbur, U.S.N.R.****

The instructor training officers of the Amphibious Training Commands make use of several graphic training aids. These aids are used in the instructor training classes to help explain ideas and to emphasize specific teaching techniques. They are reproduced here to facilitate their wider application by those engaged in the work of training instructors, whether it be military or civilian.

Basic ideas for these training aids are common property of the vocational teaching profession and the posters merely illustrate one way of expressing the ideas graphically.

The subjects covered are listed in the following index outline.

The Instructor: (1) selling the idea of being an instructor, (2) molding class interest, (3) voice and mannerisms, (4) qualities of a good instructor, (5) instructor attitude reflected by trainee, (6) temper control, (7) how to reprimand, (8) how not to reprimand.

The student: (9) basis of learning, (10) learning curve, (11) recognition of the trainee's good work.

Instructional Techniques: (12) selling lesson planning, (13) showing how to introduce a lesson, (14) selling demonstration techniques, (15) introduction to the demonstration, (16) demonstration techniques, (17) trainee arrangement for demonstration, (18) visual training aids, (19) selling questioning, (20) quality of good questions, (21) how to question, (22) the positive approach.

Subject Matter: (23) what to teach, (24) analysis of subject matter.

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***Assistant Training Officer, Amphibious Training, Pacific Amphibious Command, Coronado, Calif.

TEACHING
Springboard to Success!
SUCCESSFUL MEN are those who can INFLUENCE PEOPLE and SELL IDEAS. GOOD TEACHING IS SELLING IDEAS become a skillful teacher NOW- be more sure of a good job AFTER THE WAR!
1
What are yours?
3
PROPER Reprimanding
INSTRUCTION
1. IS DONE CALMLY
2. IS DONE WHEN INSTRUCTOR AND TRAINEE ARE ALONE
7
3. IS DONE ONLY WHEN DESERVED
4. INCLUDES Facts NOT MINCING Words
5. INCLUDES ENCOURAGEMENT
6. LEAVES A MAN ANXIOUS TO IMPROVE
DO YOU HOLD THE CLASS INTEREST?
WITH...
1. QUESTIONING
2. ANECDOTES
3. STUDENT PARTICIPATION
4. COLORFUL SPEECH
OR LOSE IT BY
1. TALKING TO BOARD
2. TALKING TOO MUCH
3. ALLOWING DISTRACTION
4. GOING ACADEMIC
2
The good Instructor is FAIR FIRM FRIENDLY
4
IMPROPER Reprimanding
1. WILL DISCOURAGE A MAN from TRYING
2. WILL LEAVE A MAN SORE
3. IS DONE IN ANGER
4. IS DONE IN PRESENCE of OTHERS
5. IS DONE WITHOUT CHECKING FACTS
6. IS USUALLY UNJUST
8
IT NEVER WORKS
LAWS OF LEARNING
Law of Primacy LEARNING THE RIGHT WAY FIRST IS EASIEST
9
Law of Intensity LEARNING COMES FROM VIVID EXPERIENCES
Law of Effect LEARNING IS EASY WHEN IT IS SATISFYING
Law of Readiness LEARNING-INVOLVES INTEREST-DESIRE WILLINGNESS with PROPER CONDITIONS
Law of Exercise LEARNING INVOLVES REPETITION
Students... LEARN MORE than SUBJECT MATTER
TEAMWORK
DISCIPLINE
5
THEY LEARN Attitudes
CAN YOU CAN'T TEACH An OLD DOG NEW TRICKS
10
THE GENERAL FORM OF THE CURVE OF ABILITY TO LEARN IN RELATION TO AGE.
TO HANDLE MEN WELL-
6
LEARN TO HANDLE YOURSELF FIRST-
The STAR of YOUR SHOW
CONFIDENCE
PROPER ORDER
STUDENT ACTIVITY
LESSON PLAN
STANDARDIZED LESSONS
REMEMBER KEY POINTS
12
WHEN A TRAINEE DOES A GOOD JOB
11
Give HIM CREDIT FOR IT.

Teaching technique visual aids

Good Books Deserve Good Treatment

*Harold H. Kirk**

But few people know how to take adequate care of their books. School children are especially ignorant and thoughtless in the handling of their own books and those of public and private libraries. This is due in part, no doubt, to their lack of an appreciative understanding of how books are constructed and bound. But to a greater degree it is due to the lack of full information regarding how to actually care for books. If a book is worthy of a cover, it is worthy of care that will continue the life of the book for years of service.

Most of our books are machine cased and are not too often built for years of hard usage. Those that are well bound, with extra workmanship, demand care that is commensurate with their value.[1] Many factors that are injurious to the leather covering of books are such common things like pipe smoke, gas fumes, sunlight, dust, and extremes of hot or damp air. Rats, mice, cockroaches, and the bookworm also attack almost any type of binding, even though it may be treated against their ravages.

Millions of leather bindings in public and private libraries are in various stages of decay. Some may show little, if any, outward signs of decay; others, show evidence of deterioration. Their surfaces are easily scratched, they have worn corners, and they show slight cracks. Others have bindings that are badly scuffed, powdery, and dusty, and some are broken through along the hinges. Many of them are less than 25 years old, yet they must be rebound to be put into serviceable condition again.

Frequent rebinding, because of rapid deterioration, becomes an item of great cost to libraries and owners of fine books. Veitch[2] describes one of the common reasons for decay in his leaflet, when he says:

A long life is expected of leather bindings and this expectation should be realized if the leather is properly tanned and the bindings properly cared for. Of the several causes that contribute to the rotting of the leather bindings, one almost invariably is the lack of sufficient oil or grease in the leather. The timely application of dressing containing suitable oils and greases will add many years to the service of a leather binding. Such dressings lubricate the fibers, thus imparting flexibility and strength to the leather. They also protect the fibers by rendering them less absorptive and more impervious to the harmful gases that usually are in the air.

It is not possible with dressings or other treatments to restore the original good properties, life, or fiber of a piece of rotted leather. Consequently, the proverbial ounce of prevention is essential if the maximum serviceability is to be obtained.

Treatment should be started when the bindings are new and should be repeated periodically, once every year or so. When treatment is postponed, as is so often the case, until the leather shows signs of decay, it is too late to preserve the binding in prime condition. Even at this stage, however, treatment will retard further rotting and prolong the life of the binding.

Special cover dressings may be prepared and books be treated with little effort or cost.

If desired, dressing can be compounded by a commercial chemist. When making the preparations, the ingredients should be melted or dissolved by heating them on a steam bath or in a double boiler. Scorching or burning is likely to result from heating directly over a flame. This would do more harm than good.

The following preparations compiled by the United States Department of Agriculture, under the direction of Frey and Veitch, are suitable for treating leather bound books. Books should be checked and treatment applied about twice a year, depending upon where the books are kept and the atmospheric conditions around them. The recommended preparations are:

	Parts by weight
Preparation No. 1	
Neat's foot oil, pure 20° C. cold test	25.0
Lanolin, anhydrous	17.5
Japan wax, pure	10.0
Sodium stearate, powdered	2.5
Water, distilled	45.0
Preparation No. 2	
Lanolin, anhydrous	50.0
Castor oil	12.0
Japan wax, pure	5.0
Sodium stearate, powdered	3.0
Water, distilled	50.0
Preparation No. 3	
Lanolin, anhydrous	50.0
Neat's foot oil, pure 20° C. cold test	35.0
Japan wax, pure	10.0
Sodium stearate, powdered	5.0
Preparation No. 4	
Lanolin, anhydrous	55.0
Sperm oil, winter strained	25.0
Japan wax, pure	15.0
Sodium stearate, powdered	5.0

Sometimes a coating of glair or varnish is used to protect leather from adverse conditions, but unfortunately they both tend to harden leather rather than to keep it flexible, and they fail just where failure is most serious, that is at the joints. In opening and shutting, any coat of glair or varnish that has become hard will crack, and thus expose the leather of the joints and back. Flexibility is an essential quality in bookbinding leather, for as soon as the leather at the joint of a binding becomes stiff, it breaks away and the boards are opened.

Vaseline has been recommended, says Douglas Cockerell,[3] and answers fairly well, but will evaporate, although slowly. It is best, ordinarily, for one with little experience to follow one of the proved formulas just listed.

Gas Fumes Are Harmful

Gas fumes are especially injurious to leather as they contain sulphuric and sulphurous acids. The injurious effects of gas fumes on leather have been recognized for a long time, and as a consequence the use of gas in libraries is being abandoned. If books must be kept where gas is used, they should not be shelved high in the room, and great attention should be paid to ventilation.

It has often been found that leather contains as much as 3 per cent of sulphuric acid. It has been found there is a greater tendency for rapid decay of leather-bound books in thickly populated and industrial areas; in other words where the atmosphere is polluted by acidic gases.

The action of light on leather, too, has a discoloring and disintegrating effect very plainly seen when books have stood for long periods on shelves facing windows. Under these conditions, green morocco will turn brown in a short time. Frequently the back or side exposed to sunlight will be rotten and crumbling to dust, at slightest friction, while the side away from the light will be comparatively sound.

Collectors of fine books keep their rare volumes in cases, which are sometimes decorated as beautifully as the books are themselves. These cases are often lined with velvet or moiré satin to protect the leather covers. Mr. Charles H. Sloan, Columbus, Ohio, one of the foremost collectors of illuminated books, has his bookshelves faced with glass doors and velvet curtains to further protect his rare volumes from the effects of sunlight.

Tobacco smoke has been found to be injurious to leather. Cockerell says that it is certainly a mistake to allow smoking in libraries where leather-bound books are kept. Smoke has a very darkening and damaging effect upon the leather covers.

Dampness, too, will do much harm to the covers as well as to the paper. Books kept in damp places will develop mildew, and both leather and paper will be ruined. Bookshelves should never be put against the wall, nor the books on the floor. Cockerell says that there should always be space for air to circulate on all sides of the bookshelves. Damp is especially injurious if books are kept behind close-

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[1] *Bookbinding, Its History, Equipment, Materials and Hand Techniques*, by Harold H. Kirk, Unpublished Master Thesis, The Ohio State University, Columbus, Ohio, 1940.

[2] *Preservation of Leather Bookbindings*, by R. W. Frey and F. P. Veitch, U. S. Leaflet No. 69, Government Printing Office, 1930, p. 3.

[3] *Bookbinding and the Care of Books*, by Douglas Cockerell (New York and London: Sir Isaac Pitman Sons), 4th Edition, 1937.

fitting doors. The doors of bookcases should be left open from time to time on warm days.

While damp or excess moisture is very injurious to books on account of the development of mildew, unduly hot dry air is almost as bad, causing leather to dry up and lose its flexibility. It may be said that the better adapted a room is for human occupation, the better for the books it contains.

Books that are not kept in individual cases should be taken from the shelves at least once a year, dusted and aired, and the binding rubbed with one of the preservatives listed previously. Even the natural oil on the hands will do much to keep the book-cover texture alive. To dust a book, Cockerell explains that it should be removed from the shelf, and without being opened, turned upside down and flicked with a feather duster.

Pests Injurious to Fine Books

Books are injured frequently by insects known as bookworms. These are the larvae of several sorts of beetles, most commonly perhaps of *Anobium domesticum* and *Niptus hololeucus*. They are not in any way peculiar to books, however, and will infest the wood of bookshelves, walls, or floors. A good deal can be done to keep "worms" away, says Cockerell, by using such substances as camphor or naphthalene in the bookcase. Bookworms do not avidly attack modern books. This is because they dislike the alum put in the paste and the millboards some of which are made from old tarred rope. Some makes of modern book cloth are specially vermin treated when it is made.

When, on shaking the boards of an old book, dust flies out, or when little heaps of dust are found on the shelf on which an old book has been standing, it may be considered likely that there are bookworms present. It is easy to kill any that might be hatched by putting the book in an air-tight box surrounded by cotton soaked in ether; but that will not kill the eggs, and the treatment must be repeated from time to time, until the book is rid of the obnoxious insects.

Rats and mice gnaw at the backs of books to get at the glue, so means should be taken to get rid of these rodents if they should appear in public libraries. Mice especially will nibble vellum bindings or the edge of vellum books that have become greasy with much handling.

Cockroaches are very troublesome in libraries, because they eat the bindings. It is quite improbable, however, that these huge "bugs" will be found in the home library. If they are found, Cockerell recommends Keating's Insect Powder, which will keep them away from the books if used frequently.

Valuable Books Need Special Handling

Now that the book has been freed of its important enemies, it is necessary to learn how to actually handle it. This is very true of the large or new book. John J. Pleger has outlined the steps very thoroughly in his book, *Bookbinding*,[4] and they are well worth repeating. His excellent summary very adequately covers the final suggestions for the right way to handle valuable books — and all books are valuable or they would not have been bound. Pleger says in part:

No commodity plays as important a part in our daily lives as books, yet a glance at almost any bookshelf will reveal ignorance as to their proper care. No book should be handled as if rivets and nails were used in its construction. Dropping a book on its edge or corners will smash the board; putting a book, especially a large book, on a shelf with force will cause the joints to loosen and eventually to break. To slide a lot of books on their edges will invariably result in peeling the leather. Sliding books on the table is bad usage, as sand or dust will scratch them.

When taking a book from a tightly arranged row upon a shelf, do not pull the headband, but rest the index finger on the edge and bring it forward until the book can be grasped with the hand. The necessity for rebinding so many volumes is due to pulling the headbands off the back and tearing the leather or cloth, while using too much force in taking books from the shelves. Librarians should provide sufficient space on the shelves to permit the withdrawal of books with ease.

To prevent the leaves from sagging, thereby pulling the rounding from the back, at the top, a piece of board should be fitted under the lower or bottom edge of the book before placing it on the shelf. This should be equal in thickness to the size of the square projecting over the edge. This applies to thick books only.

The back of a book should not be dropped on the table before opening, as it flattens the back, and the round will eventually become soft and the hubs become loose. Tossing or dropping a book on the floor may break its back.

The ordinary book should not be used as a scrapbook for clippings or notes. There is no provision in the back for additional space between the covers or leaves. This practice invariably results in broken joints and causes the book to fall out of the cover.

If the flyleaves stick to the boards when opening a new book, bend it a trifle inward, and insert a knife or folder, and loosen the leaves. To hold both covers of an open book tight while forcing the center up will break the back. To open a new book, begin at the front, and turn over a few leaves at a time, resting the left hand lightly on the leaves as turned, until the middle is reached; then close the book, and repeat the operation from the back. A book thus treated will open flat and maintain its shape; there will also be less likelihood of breaking the back.

[4] *Bookbinding*, by John J. Pleger, Inland Printer Company, Chicago, Illinois, 1924.

Summary

Any book worthy of binding is worthy of proper consideration and care in handling and treatment. Somehow, the young users of books should be made conscious of this fact. Proper forwarding and finishing, coupled with the best materials, plus careful handling, should provide a book which will give many years of service and pleasure to the user. Book jackets of durable materials would add to the ability of the reader to keep the cover from becoming soiled. Some books are purchased with slip cases which also do much to keep the book clean, square, and out of the sunlight. Vacuum cleaners can do much to keep down dust and save hours of dusting individual books.

Bookbinding is an important industry but present information relative to the craft is inadequate and practically unknown to the reading public. Educational experiences in this trade are negligible in terms of actual practice in our public schools. If each youngster in our public schools could be provided with the opportunity to bind a book, a much greater understanding and appreciation for the book would result. It would be much easier to teach book care.

Selected Bibliography

Bookbinding, by William F. Matthews (New York: E. P. Dutton Company).

Bookbinding and the Care of Books, by Douglas Cockerell (New York and London: Sir Isaac Pitman Sons).

Bookbinding As an Art, by Meiric K. Dutton (Norwood, Mass.: The Holliston Mills, Inc.).

Bookbinding, by John J. Pleger (Chicago, Ill.: Inland Printer Company).

Preservation of Leather Bookbindings, by R. W. Frey and F. P. Veitch, U. S. Leaflet No. 69 (Washington, D. C.: Government Printing Office).

Bookbinding Materials, by George T. Groome (Washington, D. C.: Government Printing Office).

Bookbinding, by S. J. Vaughn (Bloomington, Ill.: School Publishing Company).

A Course in Bookbinding for Vocational Training, by E. W. Palmer (New York: Employing Bookbinders of America).

Bookbinding in Schools, by J. S. Hewitt-Bates (Peoria, Ill.: The Manual Arts Press).

Preservation of Your Fine Books, The Art of Repairing and Refurbishing, Leaflet (Chicago, Ill.: The Monastery Hill Bindery).

Bookbinding Made Easy, by Lee M. Klinefelter (Milwaukee, Wis.: The Bruce Publishing Co.).

Let's Bind a Book, by Guy A. Pratt (Milwaukee, Wis.: The Bruce Publishing Co.).

TO MAKE A TON OF STEEL

"Have at hand — 2800 pounds of iron ore; 16,000 pounds of air; 480,000 pounds of water; 87,000 cubic feet of gas; 1600 pounds of coal; 825 pounds of limestone; 4300 pounds of steam; 1500 pounds of steel scrap — also fluxes, alloys, refractories, electric power, sulphuric acid, muriatic acid, fuel oil, pitch — and furnaces capable of developing 27,000,000 B.T.U. for each ton of steel to be shipped — plus a tremendous amount of 'know how.' America is making millions of tons each year." — From *Mineral Industries*, March, 1945.

Fundamental Objectives of Vocational Distributive Education

*Murray Banks**

A consideration of sound objectives is of fundamental importance in any vocational program. The objectives that are adopted will have an important influence on the growth and development of the program. This article will discuss (1) the statements of aims found in syllabi and courses of study in the field of distributive education, (2) the statements of leaders and specialists in the field will be listed, and (3) a statement of aims and objectives for the cooperative course of study which was adopted for the Millville, N. J., High School.

Aims of the Training

As Stated in Syllabi and Courses of Study

Glenn O. Emick, in 1936, made a careful study of the aims of cooperative study in retail selling as listed in syllabi and courses of study of eight cities.[1]

The aims listed in the order of their rank are:

a) To give students insight into scientific laws and methods of retailing.

b) To prepare students to enter the profession of retailing.

c) To give students an idea of the social importance of good salesmanship and its relation to community welfare.

d) To give pupils an understanding of business ethics.

e) To give students a general understanding of business organization.

f) To prepare students to meet and work successfully with people.

g) To prepare students to be better buyers.

h) To develop the personality and character of the students.

Other aims contained in the syllabi or courses of study:

1. To provide the pupil with an education which has a broadening influence.
2. To teach pupils to estimate the value of money as expressed in wide expenditures and saving.
3. To emphasize to pupils the ideal of service.
4. To apprise the students of the relations of employer and employee.
5. To familiarize the students with sources of merchandise and channels of distribution.
6. To familiarize the student with certain fundamental merchandise.
7. To give students an understanding of the need and value of organization in business.
8. To give students an understanding of the art of selling one's services.
9. To teach students how to present ideas orally in a clear and convincing manner.

It will be noted that aim (*a*) "To give students insights into scientific laws and methods of retailing" and aim (*b*) "To prepare students to enter the profession of retailing" are of vocational nature. Although the former aim relates to "insights" it is one definitely necessary to vocational ability. Aim (*c*) "To give students an idea of the social importance of good salesmanship and its relation to community welfare" is given third ranking. This aim relates to the social outcomes of the instruction.

As Stated by Teachers and Co-ordinators

Fifty-six teachers and co-ordinators responded to a questionnaire asking them to list one or more aims of the training.[2]

The aims as stated by the teachers and co-ordinators in the order of their rank are:

a) To prepare students to enter the profession of retailing.

b) To give students insight into scientific laws and methods of retailing.

c) To help pupil find out for what field he is best fitted, and acquaint him with this field.

d) To prepare students to meet and work with people successfully.

e) To develop in pupils an understanding of business ethics.

f) To give such training as will bring promotion to the pupil in his field.

g) To impress upon the pupil the social importance of work in this field.

h) To develop the personality and character of the pupil.

i) To prepare students to be better buyers.

It may be noted that there is but slight change in the ranking of the aims as stated by courses of study and by teachers and co-ordinators. Teachers and co-ordinators of the subject are more likely to stress the vocational aspects of this training.

As Stated by Merchants

A study of salesmanship and content material appropriate for the secondary schools of Colorado attempted to determine the aims for instruction in salesmanship.[3] A list was compiled of the aims mentioned by authorities in the field of commercial education, then the list was sent to a large number of merchants in the state, asking that they rank the aims according to importance. The following is the ranking of the aims by the merchants:

1. To familiarize the pupil with the principles of salesmanship.
2. To prepare him for a gainful occupation.
3. To familiarize him with certain fundamental merchandise.
4. To familiarize him with the sources of merchandise and the channels through which it passes in reaching the consumer.
5. To cultivate personality and character.
6. To cultivate high standards of ethics.
7. To give the pupil an appreciation of values which will make him a better buyer of merchandise for personal use.
8. To familiarize him with the relations of employee, employer, and customer.
9. To impress on him the importance and need of adopting "service" as his ideal.
10. To teach him to properly evaluate the position of the merchant and the salesman in the social order.

The ranking of aims by these merchants is to a great extent similar to the aims as ranked in courses of study and by teachers and co-ordinators. It is to be expected that the vocational phases of the training would be emphasized by the merchants who are likely to approve the practical. The similarity of rankings predicates that, from the merchant's point of view, the aims as used in the teaching of the subjects are in keeping with the needs.

Fundamental Objectives of Distributive Education

It is generally agreed by most curriculum makers in distributive education that the following specific objectives are fundamental:

To develop in those enrolled in it the following abilities:

1. To appraise correctly people with whom they have business relations, including buyers, employers, employer representatives, fellow salespeople, and employees who are subordinate to them.
2. To adopt a pleasing manner in meeting those with whom they come in contact with their work.
3. To speak the English language correctly.
4. To control their conduct so as not to reveal any feelings or emotional reactions that are annoying to others.
5. To aid buyers to select the goods they need.
6. To learn the satisfaction possibilities of the goods they sell.
7. To conform to organization practices and policies as expressed in rules, regulations, and working instructions.

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[1] Glenn O. Emick, "Cooperative Training in Retail Selling in the Public Secondary Schools," *Vocational Education Bulletin No. 186*, U. S. Department of the Interior, Office of Education, 1936, p. 24

[2] *Ibid.*, p. 25.

[3] M. C. Boatman, *Specialized Fields in Salesmanship and Content Material Appropriate for the Secondary Schools of Colorado*, M. A. Thesis, Colorado State College, Greeley, Colo., 1929, p. 17.

8. To read, write, and compute whatever is required by their selling activities.

Aims Adopted for the Millville Program

The following principal objectives for the cooperative program in Millville as it affects both the pupil and the employer were adopted:[4]

1. The pupil is prepared for gainful work, is given a business background that should enable him to qualify for a position of responsibility earlier, and is trained to meet and work with people successfully.

2. The pupil is made familiar with fundamental merchandise, with the sources of the merchandise, and he is given an appreciation of values that will make him not only a more intelligent and helpful salesman but also a better buyer of goods for personal use.

3. The pupil has an opportunity for genuine work experience at a wage, supplemented by school instruction directly related to his immediate task. He is brought face to face with actual business situations and given tools with which to cope with those situations.

4. A further important objective is to teach young people to evaluate properly the social and economic position of the merchant and the salesperson. It is believed that if young people generally regard retailing as a worthy occupation, a better type of young person will be drawn into these professions and businessmen will have more capable employees to advance to responsible positions.

Summary of Fundamental Objectives of Distributive Education

One of the important objectives of distributive education is to help distributive workers give better service and thereby promote the general welfare of both producers and consumers. In this objective lies the broad social and economic justification for public school instruction of workers in distributive occupations.

Vocational education for salespeople should be conducted to help this group learn how to give better service to consumers.

There are two closely related kinds of satisfaction which purchasers want: (1) satisfaction with the goods they purchase, and (2) satisfaction with the conduct of the salesperson. Both of these are so important that they should be regarded as major objectives in all courses for salespeople and consumer contacts of employees.

Closely related to a knowledge of a purchaser's standards for satisfactory goods is a knowledge of a purchaser's standards for business behavior. Studies have shown that more purchasers are dissatisfied with the way salespeople treat them than with the goods purchased.[5] Hence, all vocational education programs for salespeople should give major attention to helping salespeople understand how to behave in ways which are socially pleasing to customers.

[4] Murray Banks, "Cooperative Distributive Education Comes to Millville," *Journal of Business Education*, January, 1942, p. 28.

[5] "Cooperative Part-time Retail Training Programs," *Vocational Division Bulletin No. 205*, United States Department of the Interior, Office of Education, 1939, p. 13.

Johnny Got 73

*R. Randolph Karch**

Johnny got 73 on his test paper, and he wondered what it meant. That is what caused all the trouble — what worried Miss Minch, and what puzzled Johnny. No, not that Johnny got 73, but because he wondered what it *meant!*

Johnny looked at his paper, pursed his lips, and thought. And then, not knowing where else to go to find out what 73 meant, he went to his teacher.

As the happy cries of the children became more indistinct, Miss Minch sighed and said to herself, "Well, I *would* be a school teacher!" She rummaged through the stacks of papers on her desk.

She was happy, at first and only at first, when Johnny appeared. He stood at the door, seemingly afraid to come in. Miss Minch liked shy boys. In fact, when she was younger . . . but that is another story. She called to him. "Come in, Johnny!" She liked that musical call. At least, she thought, I still have my *voice*.

Johnny entered, gulped, and said, "Miss Minch, may I ask a question?" Miss Minch smiled and nodded.

He blurted out, "Miss Minch, what does 73 mean?"

She smiled patronizingly. "Seventy-three means that you made 73 *per cent* on the test, Johnny."[1]

"Seventy-three per cent of what?"

"Why," said the startled Miss Minch, arching her eyebrows and pushing back a lock of hair, "73 per cent of perfect, of course."

Johnny pondered, pulling on his lower lip.

"What's perfect?" he asked.

After a hard day with the dear little children, Miss Minch was in no mood to answer riddles. "What's perfect," indeed!

"Perfect," she explained, smiling softly, "is when you get all of the answers right, of course." She turned back to her papers.

But Johnny came from a long line of mules. He was stubborn. He remained, fixed to the spot, rolling the paper and scratching the floor with his toe.

"Miss Minch," he said at last, "if I had gotten 100 per cent, would you have known how much I *really* knew?"

"John," said the exasperated teacher, "I have much work to do." The reader will recognize this as the "old run-around," so often resorted to in educational circles. "Suppose you run along now and play." She turned, agitated, back to her papers.

Johnny was rooted. And when Johnny was rooted, he stayed that way until he was uprooted. Nothing save an understandable explanation or threats of physical violence could do it. His father and mother could testify to that fact.

"What is passing?" asked Johnny.

"Passing, *as you know*, Johnny," said Miss Minch severely, glaring at Johnny with one eye, "is 70 per cent."[2]

"Are all passing marks on tests 70 per cent, Miss Minch?"

"Yes," said Miss Minch shortly, resignedly resting her plump face on the palms of her hands. Anticipating another question, she quickly added, "It is a rule of the Board of Education."

"What was the average of all marks on the test, Miss Minch," said Johnny, with an involuntary step backward as she looked up.

"We-e-e-l, I haven't figured it out yet." She reflected. Maybe I should do it, she thought.

"I would like to know," said Johnny, "so I could see where I stood with the other students."[1]

Miss Minch mumbled something unintelligible, and began to move the papers on her desk. She began to lose more

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[1] *"Rank" Students; Do Not "Per Cent" Them* — A "grade" of 73 per cent, standing alone, is utterly ridiculous. Miss Minch did not know what it meant any more than Johnny did! If the highest mark in the class had been 76 per cent, with a spread of all grades perhaps 20 points, then Johnny did very well in the test. On the other hand, if the highest mark had been 98 per cent, with a spread of 30 points, then Johnny did not do well in the test. Using the ranking process, Johnny may have been in Rank No. 2 in the first instance. In the second instance, he may have been in Rank No. 30 in a class of 35 students. The establishing of a passing score must be made after a careful perusal of all the marks.

To say "Johnny, you ranked fifth in a class of 25 students" means much more to Johnny (and to the teacher, too) than to say, "Johnny, you got 73 per cent." Any arbitrary rule, made by anybody, that 70 per cent is passing is silly.

Marks on papers returned (all good teachers return papers) to the students should be in this form: 6/35. Interpreted, this means that Johnny ranked sixth in a class of 35 students. Johnny immediately knows that there is room for his improvement, but that, by comparison with others in the class, he did fairly well in the test.

[2] *"Passing" Scores Vary* — Scores that determine whether a student has "made the grade" are never the same on different tests. This passing mark can only be established by standards established for *each* test.

patience when Johnny stated his next query:

"Why do we have tests, Miss Minch?"[3]

"To give you a grade, of course," she answered.

"I see," said Johnny, puzzled, but forsaking the argument after seeing little beads of perspiration on her face.

"There is a 'minus 5' on my paper," he stated, pointing to the mark. "What is that for?"

"That is five points taken off for not having correct margins. You must adhere closely to the rules when taking an examination, John!"[4]

"I'll try to remember that," he said, frowning, "but I guess this time I was thinking more about the answers than I was about the form." Miss Minch shrugged.

"I don't like to bother you, Miss Minch, but I have just a few more questions I would like to ask, if you don't mind," said Johnny wistfully.

Miss Minch sighed, raised her eyebrows and head, expecting the worst. Her expectations were satisfied, when Johnny took a deep breath and asked:

"I think I know the subject fairly well, but it seems that you asked the wrong questions — that is," he corrected himself hastily, "if you had asked other questions about the lessons I would have made a better grade. There were only ten questions."[5]

"Everybody had the same chance," she explained, "and ten questions are quite a large number for me to read and grade when tests are given." With a sweep of her hand she indicated the litter on her desk.[6]

Johnny was looking at his paper. "Are all questions worth ten points? It seems that the first question is harder to answer then the second . . . "

Miss Minch stood, and a harshness entered her voice. "I am very busy grading these papers, John, but I will answer just this last question. All answers in the test are equal, and each is worth ten points.[7] That is the way all the teachers grade papers in this school. Now, if you will excuse me . . . " and she folded her arms.

Johnny was uprooted, but dissatisfied. He had heard the answers, but there was something very strange about them. But, looking at Miss Minch, he knew when to quit.

"Thank you, Miss Minch." Johnny slowly left the room, closing the door softly behind him.

Miss Minch sat down, and began to read an examination paper. "Hmmmm," she said half aloud. "This is Gertrude Jones's paper. She doesn't do so well usually, so she'll have to show me . . . "

Miss Minch was bothered, but did not know why. Now and then Johnny's questions kept bobbing up in her mind. She would frown, rub her cheek, and gaze absently out of the window.

Poor Miss Minch. She was a creature of habit, a victim of the old rule of thumb in education. She will never know the true effectiveness of her work. Good testing procedures would help her.

And Johnny, that genius of the improbable, who could be named both Frank and Ernest, will never know where he stands in school work.

[3] *Reasons for Tests* — Reasons for tests are not, as Miss Minch puts it: "To give you a grade." They are: To find and correct weaknesses in teaching on the part of the teacher, and weaknesses in learning on the part of the student; to provide incentive, and to capitalize on the natural competitive spirit inherent in American children; to provide standards for comparing the learning ability of students, so that they can be compared, one with all others, and ranked in scholastic ability. Last — tests are *teaching* devices.

[4] *Stick to the Subject* — To penalize a student for using both sides of a sheet of paper, or for being off the required margin ½ in., or for misspelling a word when the subject is not spelling is not only unfair to the student, but does not give an accurate picture of the teaching or learning.

[5] *Test on All Things Taught* — The closer one approaches the advantages of testing on all things taught, the more valid is the test. Sampling is best when sampling is large. If 500 major items are taught, a test on 100 is better than a test on 50. This, of course, emphasizes the need of objective-type tests because of the short time element. Miss Minch is a sucker for unnecessary work with her essay-type tests, whatever the subject.

[6] *Essay Tests Are Passe* — Essay-type tests, in which the students answer questions in longhand and in sentence form, are quite outside the 1945 world. They cannot be uniformly evaluated, not only by different teachers of the same subject, but by the same teacher at different times. Note how Miss Minch is ready to make Gertrude Jones "show her." Ranks or grades based on essay-type tests are not a true picture of the teacher's ability or of the student's ability.

[7] *Weight Questions* — Questions should seldom have the same weight as to value in any test. Some are obviously more important to the subject than are others. The age-old method of writing ten questions, and then arbitrarily allotting a 10 per cent value to each is a false assumption. Some questions have more value; some have less value.

Teaching Materials for Industrial Education

*Chris H. Groneman**

(*Continued from page 205 of the May, 1945, issue*)

Films

The following list of teaching aids was collated to help the teachers of the various departments of industrial arts and vocational education.

It is advisable that teachers use school stationery when writing for any of the films listed. Films should be ordered well in advance — several weeks' notice would be desirable. In ordering films it is best to mention a second and third choice in case the first selection cannot be furnished at once. The size of the film should be specified, and the desired date must be given; also an alternate date, if possible.

Prompt return of films is essential to assure available prints for the next exhibitor. A 16mm. sound print must be projected only on 16mm. sound projectors. Projection on a silent machine will ruin the film for all future use.

All films are free unless otherwise noted. Transportation charges must be met in every case. The borrower is required to pay for any loss or damage done to the films in his possession. Where a loan fee is requested, that fee should be included with the order to save time and correspondence concerning this.

Industrial and General (continued)

Wisconsin, University of, Bureau of Visual Instruction, Madison, Wis. Educational Motion Pictures (Service charges on silent films inside and outside of state—50 to 75 cents per reel; on sound films inside and outside of state—50 cents to $1.25 per reel.) (General catalog and special bulletins listing 1400 sound and silent educational film subjects supplied upon request.)

Y.M.C.A. Motion Picture Bureau,[4] 347 Madison Ave., New York, N. Y. Catalog listing over 1000 subjects — Film service for registration fee of $2 per year.

Films No.

S-125—To New Horizons (3 reels)—Sound
S-127—Futurama (1 reel)—Sound
S-130—Behind the Cup (4 reels—color)—Sound—(Available from Chicago and San Francisco only)
S-131—A Romance of Industry (2 reels)—Sound
S-132—The Beneficent Reprobate (3 reels)—Sound—Service charge —50 cents
S-133—It's Up to Us (1 reel)—Sound
S-135—How Young America Paints—1941 (1 reel—color)—Sound
S-144—Telephone Arsenal (2 reels)—Sound
S-145—The Fourth Kingdom (3 reels)—Sound
S-146—Science Saves the Surface—Sound
S-148—We Drivers (1 reel)—Sound
S-150—The Voice that Science Made (1 reel)—Sound
S-151—A Modern Aladdin's Lamp (2 reels)—Sound
S-154—Where Mileage Begins (2 reels)—Sound
S-155—For America We Save (3 reels)—Sound

*Industrial Education Department, A. & M. College of Texas, College Station, Tex.

[4] Chicago address: 19 So. LaSalle St.; San Francisco address: 351 Turk St.; Dallas, Tex., address: 1700 Patterson Ave.

S-157—New Romance of Glass (2 reels)—Sound
S-158—Victory Is Our Business (1 reel)—Sound
S-159—Voices in Paper (1 reel)—Sound
S-163—Diesel—The Modern Power (1 reel)—Sound
S-164—Modes and Motors—Sound
S-165—Safeguarding the Speechways (2 reels)—Sound
S-167—Rubber Goes Synthetic (2 reels)—Sound (Restricted to certain states)
S-169—Trees and Men (1 and 4-reel versions)
S-180-1—Before the Alarm (1 and 2-reel versions)—Sound
S-181—Deep Horizons (4 reels—color)—Sound
On to Jupiter (2 reels)—Sound
S-228—What's an Office, Anyway? (3 reels)—Sound
S-242—America Learns to Fly (1 reel)—Sound
S-244—Plywood: The Miracle in Wood (3 reels—color)—Sound
S-247—Coffee the Pride of Colombia (2 reels—color)—Sound
S-465—Aluminum (1 reel)—Sound—Service charge 50 cents
S-467—Women in Defense (1 reel)—Sound—Service charge 50 cents
S-468—Bomber (1 reel)—Sound—Service charge 50 cents
S-487—Tanks (1 reel)—Sound—Service charge 50 cents
S-488—Building a Tank (2 reels)—Sound—Service charge 50 cents
S-489—Ring of Steel (1 reel)—Sound—Service charge 50 cents
S-490—Lake Carrier (1 reel)—Sound—Service charge 50 cents
S-414—The Tree in a Test Tube—Sound—Service charge 50 cents
S-419—Trees to Tame the Wind (1 reel)—Sound—Service charge 50 cents
S-444—Operation of a Forest Nursery (1 reel)—Sound—Service charge 50 cents
S-446—Pine Ways to Profit (2 reels)—Sound—Service charge 50 cents
S-447—Know Your Money (2 reels)—Sound—Service charge 50 cents
1637—Romance of Industry (3 reels)—Silent—Free
1646—From Mine to Consumer—The Story of Anaconda (2 reels)—Silent—Free
1687—The Fourth Kingdom (4 reels)—Silent—Free

Metal

Aluminum Company of America, 801 Gulf Bldg., Pittsburgh 19, Pa.
(Transportation charges only on the following)
Unfinished Rainbows—36 min.—16 and 35mm.—Sound
Aluminum: Mine to Metal—17 min.—16 and 35mm.—Sound
Aluminum Fabricating Processes—20 min.—16 and 35mm.—Sound
General Sheet Metal Practice—20 min.—16 and 35mm.—Sound
Blanking and Piercing—15 min.—16 and 35mm.—Sound
Drawing, Stretching, and Stamping—22 min.—16 and 35mm.—Sound
Tube and Shape Bending—13 min.—16 and 35mm.—Sound
Spinning—16 min.—16 and 35mm.—Sound
How to machine Aluminum—32 min.—16 and 35mm.—Sound
How to Rivet Aluminum—26 min.—16 and 35mm.—Sound
How to Weld Aluminum—36 min.—16 and 35mm.—Sound

The American Brass Co., Waterbury 99, Conn.
From Mine to Consumer—The Story of Anaconda (color)—30 min.—Silent
Copper Goes to War (Kodachrome)—30 min.—Sound

American Institute of Steel Construction, Inc., 101 Park Ave., New York 17, N. Y.
The Backbone of Progress—30 min.—16 and 35mm.—Sound and Silent
Bridging Marble Canyon—10 min.—16mm.—Sound
Steel—20 min.—16mm.—Sound
Span Supreme—60 min.—35mm.—Silent
Bridging a Century—45 min.—16mm.—Sound
Empires of Steel—40 min.—16mm.—Silent
Lantern Slides on Steel Construction under the following general headings: Manufacture of Steel; Fabrication of Structural Steel; Erection; Welding and Welded Structures; Tall Buildings; Theaters and Assembly Halls; Garages; Airport Structures; Stadia; Miscellaneous Buildings and Structures; Miscellaneous Structural Details for Buildings; Skyride, Chicago Fair; Steel H-Piles; Steel Dams; Rigid Frame Buildings and Bridges; Arch Bridges; Cantilever Bridges; Plate Girder Bridges; Truss Bridges; Suspension Bridges; Continuous Bridges; Movable Bridges; Grade Crossing Elimination and Traffic Control; Winning Designs, A.I.S.C. Annual Student Bridge Design Competition; A.I.S.C. Annual Bridge Awards; Bridge Railings and Miscellaneous Details; Floors; Structural Resistance to Bombing.

Carboloy Company, Inc., 11198 E. 8-Mile Road, Detroit, Mich.
(Film catalog available on request.)

The Carborundum Company, Niagara Falls, N. Y.
The Jewels of Industry (Carborundum)—50 min.—16mm.—Sound
First Principles in Grinding—40 min.—16mm.—Sound

Cincinnati Milling and Grinding Machines, Inc., Cincinnati 9, Ohio.
Physics of Metal Cutting—16mm.—Silent

The Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland 14, Ohio.
Uses and Abuses of Twist Drills—26 min.—16mm.—Sound

Gisholt Machine Co., 1245 E. Washington Ave., Madison3, Wis.
Turret Lathes—Their Operation and Use (color)—45 min.—16mm.—Sound

International Acetylene Association, 30 E. 42nd St., New York City.
Prosperity Process—16mm.
Profits of Progress—10 min.—16mm.—Sound

Jones & Lamson Machine Co., Springfield, Vt.
Automatic Thread Grinder—16mm.—Sound
Automatic Thread Grinder—35mm.—Slide Film
Optical Comparators—35mm.—Slide Film

Lindberg Steel Treating Co., Chicago, Ill.
Heat Treating Hints—1st Ed. (color)—60 min.—Sound
Heat Treating Hints—2nd Ed. (color)—45 min.—Sound

Linde Air Products Co., 30 E. 42nd St., New York City.
(All of the following films are silent)
A-1 Oxwelding and Cutting—The Modern Method of Joining and Severing Metals—15 min.
A-4 Automatic Machine Cutting with the Oxweld Type CM-12 Shape-Cutting Machine—25 min.
A-5 Cutting and Shaping Steel With Oxweld Cutting Machine, Type CM-15—20 min.
B-3 Oxwelding for Profit (Reel I)—15 min.
B-4 Oxwelding for Profit (Reel II)—15 min.
B-6 Oxwelding and Cutting in Production—15 min.
B-7 Oxyacetylene Welding in Industrial Production (2 reels)—30 min.
B-8 Flame-Priming the Drum Gates of Grand Coulee Dam—15 min.
B-9 Flame-Cutting of Billets and Bars—15 min.
B-11 Constructing a Pipe Line River Crossing for Power Transmission Lines by the Lindeweld Process—15 min.
D-1 Oxwelded Industrial Piping—12 min.
U-4 Unionmelt Welding—An Electric Welding Process—15 min.
U-5 Unionmelt Welding—Pressure Vessels and Pipe—15 min.
U-7 Unionmelt Welding—General Application—15 min.

Michigan Seamless Tube Co., South Lyon, Mich.
The Making of Seamless Steel Tubes—25 min.—16mm.—Sound

National Tube Co., Frick Bldg., Pittsburgh, Pa.
Walls Without Welds (4 reels)—45 min.—16mm.—Silent
The Arteries of Industry (5 reels)—60 min.—16 mm.—Silent

Republic Steel Corp., Republic Bldg., Cleveland, Ohio.
Steel—Servant of the Soil—45 min.—16mm.—Sound
Enduro—Republic's Perfected Stainless Steel—45 min.—16mm.—Sound

Allan Sherman, Chief, Bureau of Mines, Washington, D. C.
The Story of Asbestos—16 and 35mm.—Silent
Manufactured Abrasives—16mm.—Silent
The Story of Gasoline—16mm.—Silent
The Story of a Storage Battery—16 and 35mm.—Silent
The Story of the Spark Plug—16 and 35mm.—Silent
Through Oil Lands of Europe and Africa—Germany, France, Spain, Morocco, and Algeria (2 reels)—35mm.—Silent
Through Oil Lands of Europe and Africa—Poland, Greece, and Egypt (3 reels)—35mm.—Silent
The Story of Lubricating Oil—16mm.—Silent
The Power Within: A Story of the Internal-Combustion Engine—16 and 35mm.—Silent
Valves: Their Manufacture and Uses—16 and 35mm.—Silent
Automobile Lubrication—16mm.—Silent
The Evolution of the Oil Industry—16 and 35mm.—Silent
Nickel (2 reels)—16 and 35mm.—Silent
Making V-Type Engine (2 reels)—16 and 35mm.—Silent
Glimpses of Texas—Its Natural Resources and the Big Bend National Park Project—16 and 35mm.—Silent
Modern Metalworking With the Oxy-Acetylene Flame—16 and 35mm.—Silent
Safety Glass (2 reels)—16 and 35mm.—Silent
Aluminum: Mine to Metal (2 reels)—16 and 35mm.—Silent
Aluminum: Fabricating Processes—16 and 35mm.—Silent
Copper Mining in Arizona (3 reels)—16 and 35mm.—Silent
Copper Leaching and Concentration—16 and 35mm.—Silent
Copper Smelting—16 and 35mm.—Silent
Copper Refining—16 and 35mm.—Silent
Fabrication of Copper (3 reels)—16 and 35mm.—Silent
The Making and Shaping of Steel—Raw Materials—16mm.—Silent
The Making and Shaping of Steel—Making of Steel—16mm.—Silent

The Making and Shaping of Steel—Flat Rolled Products—16mm.—Silent
The Making and Shaping of Steel—Bars and Structural Shapes—16mm.—Silent
The Making and Shaping of Steel—Rails, Wheels, and Axles—16mm.—Silent
The Making and Shaping of Steel—Wire and Wire Products—16mm.—Silent
The Making and Shaping of Steel—Pipe and Tube Manufacture—16mm.—Silent
Alloy Steels—A Story of Their Development—16 and 35mm.—Sound
Nickel Mining—16 min.—16mm.—Sound
Nickel Mining and Smelting—17 min.—16mm.—Sound
Nickel Refining—10 min.—16mm.—Sound
The Power Within: A Story of the Internal-Combustion Engine—19 min.—16mm.—Sound
Lead Mining in Southeast Missouri—33 min.—16mm.—Sound
Lead Mining, Smelting, and Refining—34 min.—16mm.—Sound
Manufactured Abrasives—24 min.—16mm.—Sound
Diesel: The Modern Power—19 min.—16mm.—Sound
Sulphur—20 min.—16mm.—Sound
The Story of the Spark Plug—35 min.—16mm.—Sound
Nickel Highlights—34 min.—16mm.—Sound
Lubrication—30 min.—16mm.—Sound
Heat and Its Control—20 min.—16mm.—Sound
The Story of Rock Wool Home Insulation—35 min.—16mm.—Sound
How to Machine Aluminum—32 min.—16mm.—Sound
How to Rivet Aluminum—27 min.—16mm.—Sound
Aluminum: Mine to Metal—18 min.—16mm.—Sound
Aluminum: Fabricating Processes—19 min.—16mm.—Sound
First Steps in First Aid—31 min.—16mm.—Sound
Help Wanted—31 min.—16mm.—Sound
Stainless Steel—29 min.—16mm.—Sound
Petroleum and Its Uses—42 min.—16mm.—Sound
Synthetic Rubber—28 min.—16mm.—Sound
Magnesium—Metal From the Sea—28 min.—16mm.—Sound
Airplanes—Their Metal, Finish, and Lubricants—30 min.—16mm.—Sound

South Bend Lathe Works, South Bend 22, Ind.
The Metal Working Lathe (color)—20 min.—16 mm.—Sound
Plain Turning (color)—20 min.—16mm.—Sound

Timken Roller Bearing Co., Canton, Ohio
Keep 'Em Rolling—16 and 35mm.—Sound

Union Carbide and Carbon Corp.,[5] Carbide and Carbon Bldg., 30 East 42nd St., New York 17, N. Y.
Hard-Facing—A Key to Modern Industrial Efficiency—30 min.—Silent
Hard-Facing—The Plow Share—12 min.—Silent
The Fourth Kingdom—25 min.—Sound
Science Saves the Surface—25 min.—Sound
The Story of Alloys—15 min.—Sound
Stainless Steel—15 min.—Sound

Slide Film Teaching Units:
C-1 Setting Up Oxy-Acetylene Cutting Equipment (based on Cylinders)—Number of frames, 67—Silent—$3
C-1A Setting Up Oxy-Acetylene Cutting Equipment (based on Pipe Lines)—Number of frames, 66—Silent—$3
C-2 Lighting and Adjusting the Cutting Blowpipe (based on Cylinders)—Number of frames, 58—Silent—$3
C-2A Lighting and Adjusting the Cutting Blowpipe (based on Pipe Lines)—Number of frames, 58—Silent—$3
C-3 Principles of Oxy-Acetylene Cutting—Number of frames, 70—Silent—$3
C-4 Manual Straight-Line Cutting—Number of frames, 122—Silent—$3
S-2 Testing for and Fixing Leaks in Oxy-Acetylene Cutting Equipment (based on Cylinders)—Number of frames, 83—Silent—$3
S-2A Testing for and Fixing Leaks in Oxy-Acetylene Cutting Equipment (based on Pipe Lines)—Number of frames, 80—Silent—$3
NOTE: Each of the lessons is accompanied by three Instructor's Supplements and 25 Student's Lesson Booklets. These eight lesson units make up a complete series on the fundamentals of oxyacetylene cutting and are sold as a kit for $24. Extra literature may be obtained at a reasonable price. Purchased individually these lesson units cost $3 each.

Other Lesson Units:
W-1 Setting Up Oxy-Acetylene Welding Equipment (based on Cylinders)—Number of frames, 65—Silent—$3
W-1A Setting Up Oxy-Acetylene Welding Equipment (based on Pipe Lines)—Number of frames, 64—Silent—$3
S-1 Testing for and Fixing Leaks in Oxy-Acetylene Welding Equipment (based on Cylinders)—Number of frames, 88—Silent—$3
S-1A Testing for and Fixing Leaks in Oxy-Acetylene Welding Equipment (based on Pipe Lines)—Number of frames, 85—Silent—$3
W-2 Lighting and Adjusting the Welding Blowpipe (based on Cylinders)—Number of frames, 52—Silent—$3
NOTE: These five units are part of the ten units that will make up the welding training film kit which when finished will sell for $28.
Linde Training Films on Uses of the Oxy-Acetylene Frame (20-page booklet)

The Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio.
Chips—30 min.—16mm.—Sound

Transportation

Allison Division, General Motors Corp., Indianapolis, Ind.
(The following list of motion pictures was produced by the American Air Force through the co-operation of the Allison Division. This series is available to all Air Force Training Activities; restricted and not available to schools that are not under army jurisdiction.)
Training Films
1-701 Introduction and Characteristics—The V-1710 Engine—16mm.—Sound
1-702 Unpacking V-1710—Preliminary Disassembly of Ignition Shielding Assembly and Cylinder Blocks—16mm.—Sound
1-703 Preliminary Disassembly of the Reduction Gear Assembly, Accessory Housing, Crank Case and Crankshaft Assembly—16mm.—Sound
1-704 Disassembly of the Cylinder Blocks—16mm.—Sound
1-705 Disassembly of the Reduction Gears V-1710 Type "F" Engine—16mm.—Sound
1-706 Disassembly of the Reduction Gears V-1710 Type "E" Engine—16mm.—Sound
1-707 Disassembly of the Accessory Housing—16mm.—Sound
1-708 Disassembly of the Crankcase Unit—16mm.—Sound
1-709 Teardown Inspection V-1710—16mm.—Sound
1-710 Reassembling the Reduction Gears Type "F" Engine—16mm.—Sound
1-711 Reassembling the Reduction Gears Type "E" Engine—16mm.—Sound
1-712 Reassembling the Cylinder Blocks—16mm.—Sound
1-719 Reassembly of the Accessory Housing Preliminary Assembly—16mm.—Sound
1-720 Reassembly of the Accessory Housing—Bench Assembly—16mm.—Sound
1-721 Reassembly of the Accessory Housing—Final Assembly—16mm.—Sound
1-714 Reassembly of Crankshaft Unit—16mm.—Sound
1-715 Reassembling the Complete Engine—16mm.—Sound
1-716 The Allison Engine V-1710 Timing the Engine—16mm.—Sound
Slide Films (available for use with 35mm. projector). Each $2.50 postpaid.
The Allison Model "E" and "F" V-1710 Aircraft Engine
Removing the Allison Engine From the P-39 Airplane
Unboxing the Allison V-1710 Engine, and Preparation for Installation
Preparing the Allison Engine for Installation in the Airplane
Installing the Allison V-1710 Engine in the P-39 Airplane
Removal and Installation of the Reduction Gear Assembly in the P-39 Airplane
Timing the Allison V-1710 Engine

Association of American Railroads, Transportation Bldg., Washington, D. C.
Complete list of motion pictures owned by or relating to the American Railroads, compiled by Association of American Railroads. List available to teachers, librarians, and others for educational uses.

The Atchison, Topeka, and Santa Fe Railway System, care of Mr. A. A. Dailey, General Advertising Manager, 80 East Jackson Blvd., Chicago, Ill.
Along the Old Santa Fe Trail (1 reel—color)—15 min.—Silent
Arizona Winter Ranches and Desert Resorts (1 reel—color)—12 min.—Silent and Sound
Carlsbad Caverns (2 reels—color)—25 min.—Sound
Glimpses of Old Santa Fe (1 reel—color)—15 min.—Silent and Sound

[5]The training film program is being produced by The Linde Air Products Company, a Unit of Union Carbide and Carbon Corporation. The slide film units are available for sale through all district offices of The Linde Air Products Company located in 34 principal cities. In Canada, sales are made through all offices of Dominion Oxygen Co., Ltd.

Let's See Chicago (1 reel—color)—20 min.—Sound
Museum and Santa Fe Railway (1 reel—color)15 min.—Sound
New Mexico Summer Ranches (1 reel—color)—15 min.—Silent and Sound
The Operation of a Steam Locomotive (1 reel)—15 min.—Silent
San Diego Zoo (1 reel—color)—15 min.—Sound
Southern California (1 reel—color)—39 min.—Sound
Summertime in Yosemite National Park (1 reel—color)—15 min.—Silent and Sound
Winter in the Desert (color)—15 min.—Sound
Grand Canyon of Northern Arizona (2 reels—color)—25 min.—Sound
Loaded for War[6] (Railroads at War) (2 reels—color)—25 min.—Sound

[6]Write to: Mr. Lee Lyles, 80 Jackson Blvd., Chicago, Ill.

Tank Destroyers[6] (Basic and Specialized Training at Camp Hood) (2 reels—color)—25 min.—Sound
Conquest[6] (slide film with companion record)—35mm.—Sound

The Baltimore & Ohio Railroad Co., Baltimore, Md.
Pageant of American Inland Transportation (3 reels)—45 min.—16mm.—Silent
Washington, Shrine of American Patriotism (1 reel)—28 min.—16mm.—Sound

Bell Aircraft Corp., 2050 Elmwood Ave., Buffalo 7, N. Y.
Cannons on Wings (color)—16mm.—Sound
The Bell Helicopter (color)—16mm.—Sound

Bray Pictures Corp., 729 Seventh Ave., New York, N. Y.
Parachutes for Safety—45 min.—Sound
Spark Plugs in Aviation—35 min.—Sound
Ignition and Spark Plugs—25 min.—Sound

(To be continued)

Testing and Tests

TESTING PROCEDURE

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Why do we give tests? Often tests are given for the sole purpose of determining or helping to determine the mark of the student. As long as marks are given, no doubt, tests will be used to help determine the mark of the student but tests may also be used as a teaching process, as a guide in remedial instruction, and as a check on the effectiveness of the instruction.

What do we test for? All too often, the writer believes, examinations test for a memorization of facts. With this type of test a student would receive a top rating if he remembered everything the teacher said plus everything that he read, assuming that he read everything that was assigned, and could repeat it in the exact words of the teacher or the book. In addition to memorizing some facts and principles, however, the student should have the ability readily to find needed facts which he does not remember and to make use of the facts and the principles which he has found or remembered.

In an attempt to test for the ability to find facts and to use facts as well as to remember some facts, the writer has been using what he terms the *open-book* type of test. Before the test each student receives these written instructions: "For the examination next Thursday bring with you your textbook, notes, cribbing notes, and any other material that may be useful to you during the examination. You will be permitted to use any material you bring with you but you will not be permitted to use the material that other students bring or to talk with other students during the examination." These instructions are also read to the class by the instructor. During class or after the class is dismissed someone invariably asks, "Do you really mean it?" And then on the day of the examination several students always say, "I brought my books. We do not really use them, do we?"

A few typical questions are:

a) Turn to Figure 248 on page 238 of your text. What is wrong here, if anything?

b) "Please tell me how to check the valve clearance on my Oliver Row Crop 70 tractor." See "instruction manual" for Oliver tractors and answer this question.

c) "I heard a Farm Institute speaker say that he burns gasoline at all times in his tractor. Is this the best fuel?" Answer his question fully.

There are those who believe that students should be consulted concerning the instruction which they receive. These people even insist that students have the ability to evaluate instruction. Assuming that there will be some readers who have a similar faith in the ability of students, some statements of what students think of this type of examination are included.

1. This type of examination tests more than the ability to memorize. "There are so many technical facts that memory would fail me. This course is not to make us experts but to give us the underlying principles so as long as we know where to *find* the material and *apply* it why cram and get all befuddled. This is a practical test."

2. This procedure prevents the student from becoming excited and from being in a nervous tension which thus enables him to be normal or at par for the examination. "When I came to class, I was not worried about not being able to remember everything. I was able to sit down in confidence and say to myself, 'If you ever knew it, with the book's help, you can figure it out now.' I figure that it is not what a person learns, but whether he learns where he can find reference to anything he wants at any time."

3. One learns while doing the test. "I like a test like this. I can learn as much during the test as I can during class. Here we get the questions and can use what we read to answer the questions. I am sure that I will keep the answers in my mind longer this way than if I tried to memorize the book the night before taking the exam."

4. One must use facts rather than give a carbon copy of what has been read. "Just because we use the book does not mean that the answers are absolutely correct."

"To answer these questions it is necessary to apply principles, make deductions, and use material which may not even be in the book."

"On this test we had to put to practical use what we have learned and not just restate it. To cram for this test we would have had to learn the whole text and an instruction manual which is just about as possible as a one-armed blind man setting a wrist watch."

5. The examination covers a broad area. "The test was specific and involved diagrams such that cribbing would require too many crib notes. Cramming would also be useless as it was spread enough so as to make cramming too difficult."

6. This type of examination prevents cheating in examinations. "With this type of examination there cannot be any cribbing since we are allowed to use all our notes and books."

7. This procedure removes the element of chance or guessing from the examination. "If you do not know the answer, it seems useless to try to guess."

8. Some things must be remembered because there is not sufficient time in a two-hour period to look up everything. "You must know how to think along the proper lines. The questions could not be answered directly from the book but must be figured out from material given. Neither do you have time to look up everything and get the test completed."

9. This kind of examination is not a snap. "It is a good, but *mighty tough* test."

What is wrong with this procedure of testing? Seemingly there is only one serious drawback. It means much more work for the teacher because of the following reasons:

1. It is harder to prepare this type of test than it would be to arrange an essay or true-false type of test.

2. It requires more time to get materials ready than it would require to hand out a mimeographed sheet which could be prepared by one's secretary.

3. The materials must be cleared away after the test is finished.

4. A key cannot be used in grading as easily as in some other types of tests because the parts of a question will not be answered in the same order by all students.

5. Students often become interested and stay after a test to talk which takes the time of the instructor.

If the extra work which this testing procedure requires prevents its being used by a teacher, it then becomes a most serious drawback. The writer agrees that this extra work is an objection to its use, but does not believe that it should be a good reason for preventing its use.

The writer has been using this procedure for the past three years in his classes. To him it has proved very satisfactory. From the observation and comments of students this procedure seems to be approved by students not because it is easy but because they think that it is a good procedure for testing. They like the procedure because it provides a true-to-life situation in which one solves problems by securing the necessary information to supplement his store of knowledge and then by applying this knowledge toward the solution of the problem.

AIRCRAFT DRAFTING EXAMINATION

H. H. ROBINSON

Augusta, Kans.

Mark true statements with a plus (+) and false ones with a minus (—).

1. ( ) Spline and weights are used for making long irregular curves.
2. ( ) The cutting plane line is a light line made with a dash and two dots.
3. ( ) It is general practice to leave out dotted lines on section views except when they are especially necessary.
4. ( ) Without the drawing, the creation of a plane in metal would be impossible.
5. ( ) Horizontal or width distance is the same in the top view as the front view.
6. ( ) An amphibian plane can fly straight up.
7. ( ) Leonardo da Vinci studied the science of flight and he was considered the first real pioneer of aviation.
8. ( ) Da Vinci made sketches of flying machines more than four hundred years ago.
9. ( ) The ability to make sketches neatly and accurately and quickly is a necessary qualification for one engaged in aircraft engineering.
10. ( ) An auxiliary view is obtained by looking directly at the inclined surface.
11. ( ) Formers give the fuselage its shape.
12. ( ) Most airplanes now made are of the pusher type.
13. ( ) An elevator is a movable airfoil, the force of which is to produce a pitching motion on the aircraft.
14. ( ) A high wing monoplane has the disadvantage of giving poor ground visibility to the pilot.
15. ( ) Nacelle is an enclosed compartment for personnel or power plant. It is usually shorter than a fuselage.
16. ( ) A rudder is a hinged vertical airfoil for the purpose of producing yawing motion.
17. ( ) A detail working drawing gives all the information for a single piece.
18. ( ) An assembly drawing may include all parts or a group of parts.
19. ( ) A plane is always drawn so that the side elevation shows it headed to the right.
20. ( ) Small drawings are frequently divided into areas by imaginary lines.
21. ( ) Tabulated drawings are sometimes made of parts which are drawn with certain dimensions indicated by letters referring to a table of actual dimensions.
22. ( ) Standard parts are those that do not have to be designed.
23. ( ) Standard parts include bolts, nuts, washers, pins, ball bearings, keys, and the like.
24. ( ) In a class 1 fit, the nut fits very loosely on the bolt.
25. ( ) In a class 4 fit, the nut fits tight and very exactly.
26. ( ) On a single thread the pitch and the lead are not equal.
27. ( ) Screws may have single, double, or triple threads.
28. ( ) "Two inch" pipe has an outside diameter of 1⅞ in.
29. ( ) The chief characteristic of pipe threads is that they taper.
30. ( ) Pure aluminum is not used because it is too expensive.
31. ( ) When dimensioning, do not try to complete dimensioning on one view before considering the other views.
32. ( ) A dimension for radii should always be followed by an *R*.
33. ( ) When a complete circle is shown, it is best to give the radius.
34. ( ) In dimensioning the thickness of sheet metal the gauge should be given rather than the decimal dimension.
35. ( ) Parts that are bent to shape should have dimensions given to the mold lines.
36. ( ) Many standard parts do not require dimensions.
37. ( ) The forming rib is heavier than the compression rib.
38. ( ) The empennage is also called the landing gear.
39. ( ) Die casting is done by pouring metal into sand molds.
40. ( ) Drop forging is the same process as hand forging.
41. ( ) About 5 different steel alloys are used in airplane and car construction.
42. ( ) Radial type engines are air cooled.

KEY

1. (+)	10. (+)	19. (—)	28. (—)	37. (—)
2. (—)	11. (+)	20. (—)	29. (+)	38. (—)
3. (+)	12. (—)	21. (+)	30. (—)	39. (—)
4. (+)	13. (+)	22. (+)	31. (+)	40. (—)
5. (+)	14. (—)	23. (+)	32. (+)	41. (—)
6. (—)	15. (+)	24. (+)	33. (—)	42. (+)
7. (+)	16. (+)	25. (+)	34. (—)	
8. (+)	17. (+)	26. (—)	35. (+)	
9. (+)	18. (+)	27. (+)	36. (+)	

SECOND TERM TEST IN GENERAL METAL

W. H. BOWERS

High School

Tuckahoe, N. Y.

General Directions: Some of the following statements are true, some false. If true, place a *T* before the statement; if false, place an *F* before it.

1. Chasing tools are obtainable in one size only.
2. Sheet-metal objects are usually chased.
3. Fluting is a very difficult operation to perform in sheet-metal work.
4. Beautiful colors may be obtained by passing a copper object through a flame.
5. Liver of sulphur is extensively used in finishing tin objects.
6. Many beautiful effects are obtained on wrought iron objects by spraying bronze powder on them.
7. Several solutions are available for antiquing copper.
8. Butter of antimony applied to brass will give a bright shiny finish.
9. Elaborate equipment is not necessary for etching.
10. Black asphaltum is very easy to apply when etching.
11. Many jigs have been developed for bending metal.
12. A stake is used principally in connection with the engine lathe.
13. When making objects out of thin copper it is often necessary to "lap" the edges.
14. Saw piercing is usually done with a backsaw.
15. It is not very difficult to break a jewelers' saw blade.
16. The teeth in a jewelers' saw blade are pointed toward the handle.
17. Jewelers' saw blades are 10 in. long.
18. To anneal metal, it must be heated to above the upper critical point, after which it must be cooled very slowly.
19. The purpose of annealing is to make metal hard and stiff.
20. Rivets are used primarily for ornamental purposes.
21. The heads on rivets may be round or flat.
22. The most difficult way to raise material is to use a mold.
23. When raising a bowl or plate it is advisable to anneal the metal frequently.
24. The hammer used for planishing a surface is round in shape.
25. All dents in a surface can be removed by planishing.
26. Wax, applied to finished objects, gives a soft sheen that preserves the color indefinitely.
27. Dirty objects made of copper, brass, and nickel silver may be cleaned by immersing them in nitric acid.
28. Simple chasing can be done with straight and curved chasers.
29. The straight chaser is 6 in. long and ¾-in. square.
30. Very little practice is required to do a good chasing job.
31. There is only one way to raise a shape from a flat piece of metal.
32. A bowl will not be true and even in shape if you strike harder on one side than on the other.
33. A fluted part is divided into 4–6 or 8 parts.
34. The snarling iron is a tool used in raising shallow plates.
35. The handles and spouts of kettles and teapots are soldered in place.
36. The flux used in hard soldering is resin.
37. Handles are usually held in place with small clamps.
38. A vase 9 in. high can be raised by the wrinkling process.
39. Repoussé and chasing are synonymous terms.
40. Chasers' pitch is made of equal parts of Burgundy pitch and plaster of Paris melted together.
41. Half and half solder is composed of tin and lead.
42. Resin is the correct flux used when soldering tin.
43. Fluxes are used to prevent the metals from oxidizing.
44. A special flux must be used to solder pewter.
45. It is easier to solder pewter than it is to solder copper.
46. The hand groover is a tool used for locking seams on sheet metal.
47. A solid punch and a prick punch are for the same purpose.
48. Wire is placed in the edges of pails,

cups, and funnels so that the design of same will be improved.

49. The easiest operation to perform on a Rotary Allinwon Machine is the burring operation.

50. The bar bender will accommodate stock that is ½ in. thick.

51. The lathe is one of the most important power tools in the machine shop.

52. The tailstock of the lathe is movable.

53. The size of a lathe is determined by the amount of swing and the length of the bed.

54. The independent four-jaw chuck used on a lathe is a difficult chuck for a beginner to use.

55. The faceplate is used for driving the lathe dog.

56. Knurling is a very difficult operation.

57. The tang is the only portion of a file that is soft.

58. The teeth in a file were hand cut with a chisel many years ago.

59. Single- and double-cut files have two rows of teeth.

60. On power drill presses the drill is fed into the work by mechanical power.

61. The drill press is used primarily for routing.

62. It is necessary to clamp the work to the table when using the drill press.

63. Measurements on metal are usually made with a pencil and rule.

64. Upsetting is the process of increasing the thickness of a piece of metal.

65. The operation of forming a piece of hot metal is called forging.

66. It is impossible to take out a twist on a piece of metal.

67. A bending fork consists of a thick steel base with two steel prongs projecting upward.

68. A straight shank drill must be held in a drill chuck.

69. Rivets may be made of iron or steel.

70. Metal patterns are used for producing many types of castings.

71. The purpose of shaking parting sand over a pattern is to prevent the sand from sticking to the pattern.

72. The best molding sand is found in New York, Ohio, and Kentucky.

73. A casting flask usually consists of four parts.

74. In order to make it possible to see lines on metal clearly it is advisable to coat the surface with chalk or a marking solution.

75. A good rule is made of machine steel, hardened, and tempered.

76. A scriber is used for drawing circles.

77. The combination square consists of two parts.

78. Dividers are used for drawing circles and for spacing off distances in layout work.

79. A center punch must be ¾ in. thick and 8 in. long.

80. A light center punch is usually called a prick punch.

81. A caliper is used to measure and transfer sizes.

82. A hermaphrodite calipers has two similar legs.

83. A micrometer resembles a surface gauge in appearance.

84. The surface gauge and the micrometer are used for the same purpose.

85. The V block is used for holding round rods while they are being drilled.

86. Caliper gauges are nonadjustable.

87. For all-round work it is best to select a hack saw 10 in. long.

88. A hack saw blade should cut on the forward stroke.

89. Curved snips are used for making concave cuts.

90. The cape chisel has a wide cutting edge.

91. The common cuts of teeth on a file are known as single cut and double cut.

92. The twist drill may be divided into three principal parts, the point, the body, and the shank.

93. A countersink is used to enlarge the end of a drilled hole.

94. A combination pliers may be used in turning small objects in place of the monkey wrench.

95. A toolmakers' clamp and a C clamp are the same.

96. Tools used for cutting and hammering are hardened by being heated to a definite temperature and then cooling them in water or oil.

97. The hardening temperature is always the same regardless of the carbon content.

98. The purpose of tempering steel is to reduce its brittleness and to remove internal strains.

99. The exact heat for tempering tools ranges from 400 to 600 degrees.

100. The purpose of annealing is to prepare steel for machining so that it can be cut readily.

ANSWERS TO PART I OF FINAL TEST
SECOND TERM IN GENERAL METAL

1. T	21. T	41. T	61. F	81. F
2. T	22. F	42. T	62. T	82. F
3. T	23. T	43. T	63. F	83. F
4. F	24. T	44. T	64. T	84. F
5. F	25. F	45. T	65. T	85. T
6. F	26. T	46. T	66. F	86. F
7. F	27. F	47. F	67. T	87. T
8. F	28. T	48. F	68. T	88. T
9. T	29. F	49. T	69. T	89. T
10. T	30. F	50. T	70. T	90. F
11. T	31. T	51. T	71. T	91. T
12. F	32. T	52. T	72. F	92. T
13. T	33. F	53. T	73. F	93. T
14. F	34. F	54. T	74. F	94. T
15. T	35. T	55. T	75. T	95. F
16. F	36. F	56. F	76. F	96. F
17. F	37. F	57. T	77. F	97. T
18. T	38. T	58. T	78. T	98. F
19. F	39. T	59. F	79. F	99. F
20. F	40. F	60. T	80. F	100. F

VOCABULARY TEST FOR MECHANICAL DRAFTING CLASS

WALTER G. HJERTSTEDT
Chicago, Ill.

Directions to the student: Each of the sentences in the left-hand column is the definition of one of the words, or expressions, in the right-hand column. Make the proper connections by lettering neatly the number preceding the sentence in front of the word or expression in the right-hand column with which it should be associated.

1. A short, metal, boltlike fastening, without threads, which is clinched by hammering. .. orthographic
2. The distance from one thread point of a screw thread to the next, measured parallel to the axis. .. lead .. clearance .. countersink
3. The distance which a screw will move along the axis in one turn. .. tap .. fillister
4. To smooth the surface of a hole and finish it to size for a running fit. .. supplementary .. taper
5. To recess a hole conically for the head of a screw or rivet. .. perspective .. boss
6. A definite difference in dimensions to allow for variations in manufacture. .. casting .. round
7. A gradual and uniform decrease in size. .. conventional .. counterbore
8. A circular disk cast or attached to some mechanical part. .. rivet .. allowance
9. A fastening; commonly a piece of metal with head and threaded body for the reception of a nut. .. lug .. pitch diameter .. ream
10. The metal part made by pouring metal, when in a liquid state, into a mold. .. flat .. pitch
11. A projection of irregular shape as from a casting. .. caster .. bolt
12. The amount of space, open or free, between adjacent parts. .. wood screw .. tolerance
13. Resulting from or established by custom. .. drilled
14. The art or science of representing on a plane surface objects as they actually appear to the eye. .. isometric
15. A cylindrical head of a cap screw slotted for a screw driver.

KEY

1. Rivet	5. Countersink	9. Bolt	13. Conventional
2. Pitch	6. Tolerance	10. Casting	14. Perspective
3. Lead	7. Taper	11. Lug	15. Fillister
4. Ream	8. Boss	12. Clearance	

TESTS

ISADORE M. FENN

Chicago Vocational School
Chicago, Ill.

The fundamental purpose of administering tests is to help the instructor to discover the intelligence, capabilities, achievements, and interests of individuals, thereby increasing the instructor's knowledge relative to their limitations and potentialities so that he may be better equipped to help these individuals meet their special needs in this complex industrial world.

Many school people are in doubt at times as to what tests to use for specific purposes and what uses can be made of different tests. The following information will be found useful in clearing up this situation:

Uses of Different Tests

1. Achievement tests are used to measure attainment in specific schoolwork.

2. Aptitude tests are used to measure potential abilities in a specific field. (Mechanical ability or social aptitude.)

3. Intelligence tests are used for measuring general mental ability to do schoolwork.

4. Personality tests are used for measuring will, temperament, and interest values.

A Selected List of Tests and Scales

Key — *Publishers*

(A) Bureau of Publication — Teachers College, Columbia University, N. Y.
(B) The Bureau of Educational Research and Service, Extension Division, The State University of Iowa, Iowa City.
(C) Marietta Apparatus Company, Marietta, Ohio.
(D) The Psychological Corporation, 522 Fifth Avenue, New York, N. Y.
(E) Public School Publishing Company, Bloomington, Ill.
(F) World Book Company, 2126 Prairie Avenue, Chicago, Ill.
(G) Southern California School Book Deposit Company, Los Angeles, Calif.
(H) Center for Psychological Service, George Washington University, Washington, D. C.
(I) The Bruce Publishing Company, 540 North Milwaukee Street, Milwaukee, Wis.
(J) Manual Arts Press, Peoria, Ill.

Achievement Tests

Name of Test	*Publisher Key*	*Grade*	*Approximate Price*
Commercial Subjects			
Blackstone Stenographic Proficiency Tests	(B) (D)	9–10	25 for $1.25
Bisbec Junior and Senior Shorthand Tests	(E)	9–10	25 for $1.00
Breidenbough Bookkeeping Test	(E)	High School	25 for $1.00
Elwell-Fowlkes Bookkeeping Tests	(F)	9–10	25 for $1.30
Clem Junior and Senior Typewriting Test	(E)	9–10	25 for $1.00
Thompson Business Practice Test	(F)	High School	25 for $1.50
Kinney Scale of Problems in Commercial Arithmetic	(E)	9	25 for $1.00
Thurstone Examination in Typing	(D)	High School	25 for $1.50
Home Economics			
Illinois Food Test	(E)	High School	25 for 75¢
Industrial Arts			
Nash, Van Duzee Woodwork Test Scale B (Performance)	(I)	Junior and Senior High School	25 for $1.10
Hunter Shop Tests (Woodwork, mechanical drawing, machine shop, elec. shop, auto shop, printing)	(J)	Junior and Senior High School	25 dup. 25¢
Mechanical Drawing			
Wright Achievement Test of Mechanical Drawing	(E)	High School and College	25 for $2.00
Baxter Mechanical Drawing Performance Test	(I)	Junior and Senior High School	40¢ a set
Bodger Mechanical Drawing Test	(E)	High School	25 for $2.00
Castle Mechanical Drawing Test	(J)	Junior and Senior High School	50¢ per package (5 tests in package)
Music			
Drake Test of Musical Talent	(E)	Elementary and High School	25¢ a copy
Musical Achievement Test	(A)	Elementary	100 for $3.15

Name of Test	*Publisher Key*	*Grade*	*Approximate Price*
		Special Aptitude Tests	
Art and Art Judgment			
Knauber Art Ability Test	(D)	Junior and Senior High School and Adult	25 for $2.50
Meier-Seashore Art Judgment Test	(D)	Junior and Senior	10 for $6.25
McAdory Art Test	(A)	High School and College	72 plates for $15.75
Clerical			
Detroit Clerical Aptitudes Examination	(D)	High School	100 for $4.00
Minnesota Vocational Test for Clerical Workers	(C) (D)	General Clerical Workers	100 for $3.00
National Inventory of Industrial Psychology Clerical Test	(C)	General Clerical Workers	100 for $5.00
O'Rourke Clerical Aptitude Test, Junior Grade	(D)	General Clerical Workers	100 for $3.00
Thurstone Examination in Clerical Work	(C) (D)	General Clerical Workers	25 for $1.50
Home Economics			
Engle-Stenquist Home Economics Test	(F)	Elementary and High School	25 for $1.00
Mechanical Aptitude Tests			
Detroit Mechanical Aptitudes Examination	(D) (E)	Junior and Senior High School and College	100 for $3.00
McQuarrie Test for Mechanical Ability	(D)	Junior and Senior High School and College	25 for $1.25
Minnesota Tests of Mechanical Abilities (Minnesota Paper Form Board)	(C) (D)	High School and College	100 for $3.00
Newkirk-Stoddard Home Mechanics Test	(B)	Junior and Senior High School	100 for $4.00
O'Rourke Mechanical Aptitude Test, Junior Grade	(C) (D)	High School and College	25 for $1.25
Stenquist Mechanical Aptitude Tests	(D) (F)	Elementary and High School	25 for $1.30
		Other Aptitude Tests	
Aids to Vocational Interview	(C)	High School and Adult	100 for $6.00
Coxe-Orleans Prognosis Test of Teaching Ability	(D)	College	25 for $2.25
Detroit General Aptitude Examination	(D) (E)	Elementary and High School	100 for $6.00
Detroit Test of Learning Aptitudes	(E)	Individual	25 for $2.00
Teaching Aptitude Test	(D)	High School and College	100 for $9.00
Test for Ability to Sell	(D) (H)	Department Store Groups	100 for $9.00
Vocational Aptitude Examination	(D)	Sales, Technical and Executive Groups	25 for $4.00

General Intelligence Tests

Name of Test	*Publisher Key*	*Grade*	*Approximate Price*
American Council Psychological Examination for High School Students	(D)	High School (New forms each year)	100 for $5.00
California Test of Mental Maturity (diagnostic group test)	(D) (G)	High School	25 for $1.25
Detroit Advanced Intelligence Test	(E)	High School and College	100 for $3.00
Haggerty Intelligence Examination	(F)	Elementary and High School	25 for $1.00
International Intelligence Test	(H)	Elementary and High School	100 for $5.00
Mental Alertness Test	(H)	College	100 for $10.00
Miller Mental Ability Test (Form A and Form B)	(F)	Junior and Senior High School Elementary	25 for 80¢
Multi-Mental Scale (Forms 1 and 2) (Group)	(A)	High School and College	100 for $1.05
National Intelligence Tests (Scale A and Scale B)	(D)	Elementary and Junior High	25 for $1.25
Otis Quick-Scoring Mental Ability Tests (Gamma Test)	(D)	High School and College	25 for 90¢
Pinter General Ability Tests — Verbal Series	(D)	Junior and Senior High and College	25 for $1.25
Pressey Senior Classification Test and Pressey Senior Verifying Test	(C) (D)	Junior and Senior High School	25 for $1.25
Revised Alpha Examination Form 6, Short Form	(D)	High School and College	100 for $3.00
Revised Beta Examination	(D)	Elementary, High School and College	100 for $7.00
Social Intelligence Test	(H)	High School and College	100 for $12.00
Terman Group Test of Mental Ability	(D)	Junior and Senior High School and College Freshmen	25 for $1.20
Test 6 — Mental Alertness (Self-Administering)	(D)	High School and College, also (Office and Clerical Workers)	100 for $5.00
Thorndike Intelligence Examination for College Entrance	(A)	High School Graduates	50¢ for a copy
Personality Tests			
Downey Individual Will-Temperament Test	(F)	High School	25 for $1.00
Downey Group Will-Temperament Test	(F)	High School	25 for $1.40
Hildreth Personality and Interest Inventory	(A)	Elementary and High School and Guidance Work With Parents	100 for $2.10
The Humm-Wadsworth Temperament Scale	(D)	Adults	100 for $9.00
Interest-Values Inventory	(A)	High School and College	100 for $7.20
Morris Trait Index	(E)	High School and College	25 for $1.50
The Personality Inventory	(D)	High School and College and Adults	25 for $1.75
Pinter Aspects of Personality	(F)	Elementary and High School	25 for $1.20
Vocational Interest Blank for Men (Revised Form M)	(C) (D)	Men	25 for $2.00
Vocational Interest Blank for Women	(D)	Adult Women	25 for $2.00
Washburne Social Adjustment Inventory	(F)	High School	25 for $1.30
What Kind of Year Are You Having?	(A)	100 for $1.60	High School

Problems and Projects

ALUMINUM HANDLED SCREW DRIVER AND MOLD*

JOHN G. MILLER
Department of Vocational Education
New York University
New York City, N. Y.

The problem of including a large number of processes and operations in an interesting project in our general metal shop has been solved to a certain extent by the screw driver shown in Figure 1. The aluminum handle introduces a second unit in our foundry work, namely, *permanent mold casting*. The handle is turned on the machinist's lathe and fluted on the milling machine. The shaping of the blade presents operations in the forging unit of the shop and heat treatment of steels is taught in the hardening and tempering of the blade.

The making of the project also teaches the correct shape and form of screw driver blades.

The mold may be made of cold rolled steel by the first cutting of the pieces to the required length and then drilling the holes for the ¼-in. machine screws. The pieces are

*Drawings for this article were made by Barry Gordon, Public Schools, Trenton, N. J.

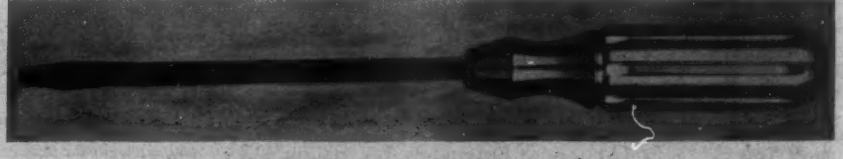


Fig. 1. The finished screw driver

then bolted together and centered in a 4-jaw chuck. The ends are faced and the mold is drilled as indicated in Figure 2. If large drills are not available, the larger diameters may be bored to size.

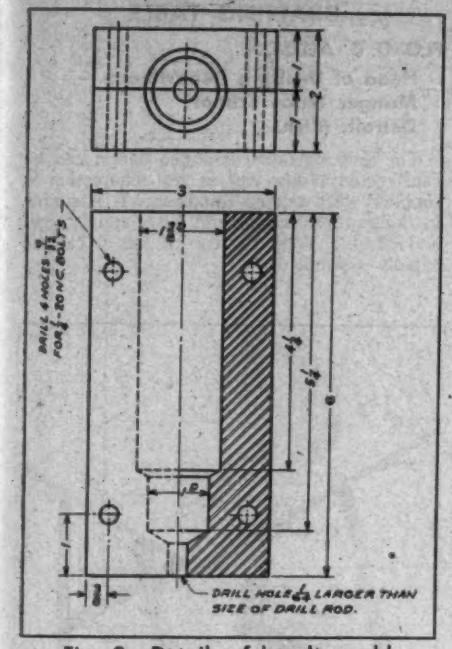


Fig. 2. Details of handle mold

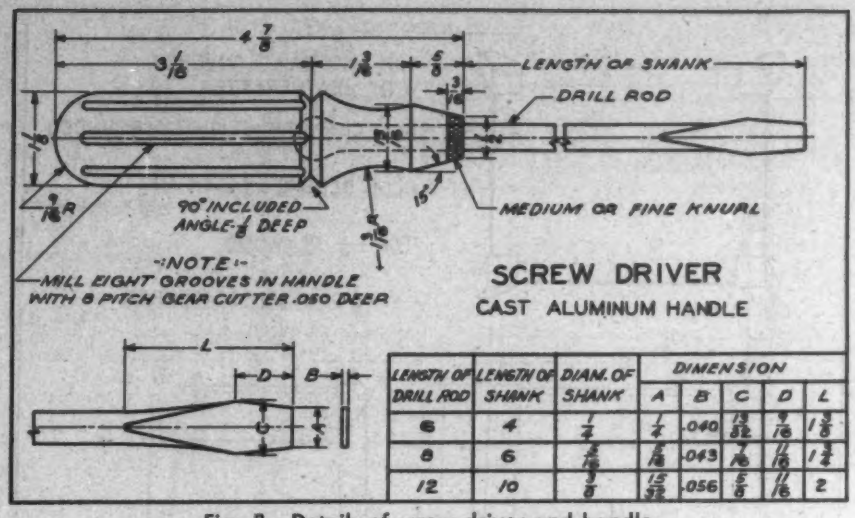
In shops where no milling machine is available, the entire handle my be knurled in place of the eight grooves as required in the drawing.

Casting the Handle

1. Cut a piece of drill rod the correct length for the diameter as shown in Figure 3.
2. Forge one flat as shown by dotted lines on the drawing. The purpose of this flat is to anchor the blade in the handle and to keep it from turning.
3. Start furnace for melting the aluminum and preheat the steel mold for the handle to about 400 – 600 deg. F.
4. While heating the metal, place the drill rod in the mold and clamp the mold together with ¼-in. bolts, or with a C clamp. Place the mold in position for pouring, making sure the drill rod is on center and extends out of the mold the correct length.
5. As soon as the aluminum has melted, pour the mold. Keep pouring slowly to take care of shrinkage as the metal cools.
6. After the aluminum has solidified, remove the C clamp and knock out the screw driver blank.
7. Cool blank by allowing water to drip on the handle.

Machining the Handle

1. Place the handle in a universal chuck, face, and drill a center hole in the end.
2. Extend the handle and grip the shank in the chuck, supporting the end of the handle on the tailstock center.
3. Turn the handle down to 1⅛ in diameter.
4. Set compound rest and turn 15-deg. angle.
5. Turn 90-deg. groove.
6. Turn the 1 3/16-in. radius.
7. Knurl the tapered portion 3/16 in. from the end.
8. Set up the blank in a milling machine and mill the grooves in the handle.



LENGTH OF DRILL ROD	LENGTH OF SHANK	DIAM. OF SHANK	DIMENSION A	B	C	D	L
6	4	¼	¼	.040	13/32	9/16	1 5/8
8	6	5/16	5/16	.043	7/16	11/16	1 3/4
12	10	⅜	15/32	.056	5/8	11/16	2

Fig. 3. Details of screw driver and handle

9. Replace the handle in a universal chuck and face to length. (If the center hole is not removed by facing, drill a 5/16-in. hole in the end about ¾ in. deep and plug the hole with a piece of 5/16-in. aluminum rod. Rivet the plug slightly.)
10. Turn 9/16-in. radius.

Blade

1. Refer to the table and detail of the blade shown in Figure 3, and forge blade to shape. (Do not quench the steel. Allow it to cool slowly.)
2. Grind and file the blade to dimensions.
3. Harden and draw temper of the blade to a blue color.
4. Polish all over.

OCCASIONAL TABLE

RUFUS JACOBY
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Coolidge High School
Washington, D. C.

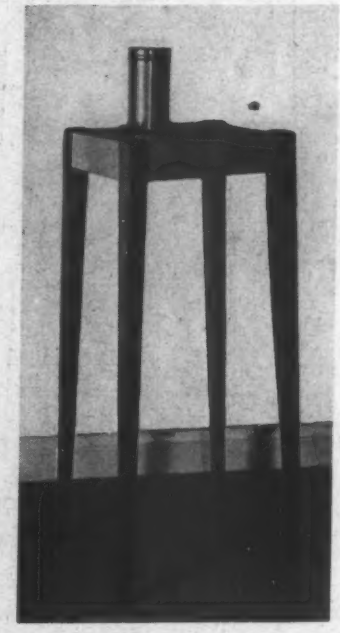
The occasional table described in this article provides the advanced industrial-arts student with a job of worth-while educational values as well as a graceful and utilitarian product. The table may be put to a number of uses around the house, such as holding refreshments, ash trays, or plants. The cost is approximately one dollar. Two board feet of wood is required; the weight is less than 4 lb.

If several tables of this type are desired, a *nest* may be designed, using the suggested size as the medium size table.

When designing the table these suggestions should be followed. The table height should not be lower than chair seat height (18 in.), or higher than table height (30 in.). The legs are straight, tapered on the two inside edges. To provide stability the legs are set at an angle. A good rule to follow to get this angle is: the inside dimension at the leg bottom is the same as the outside leg dimension at the top (10¼ in. in this case).

The pupil may check his plan of procedure with the following steps:

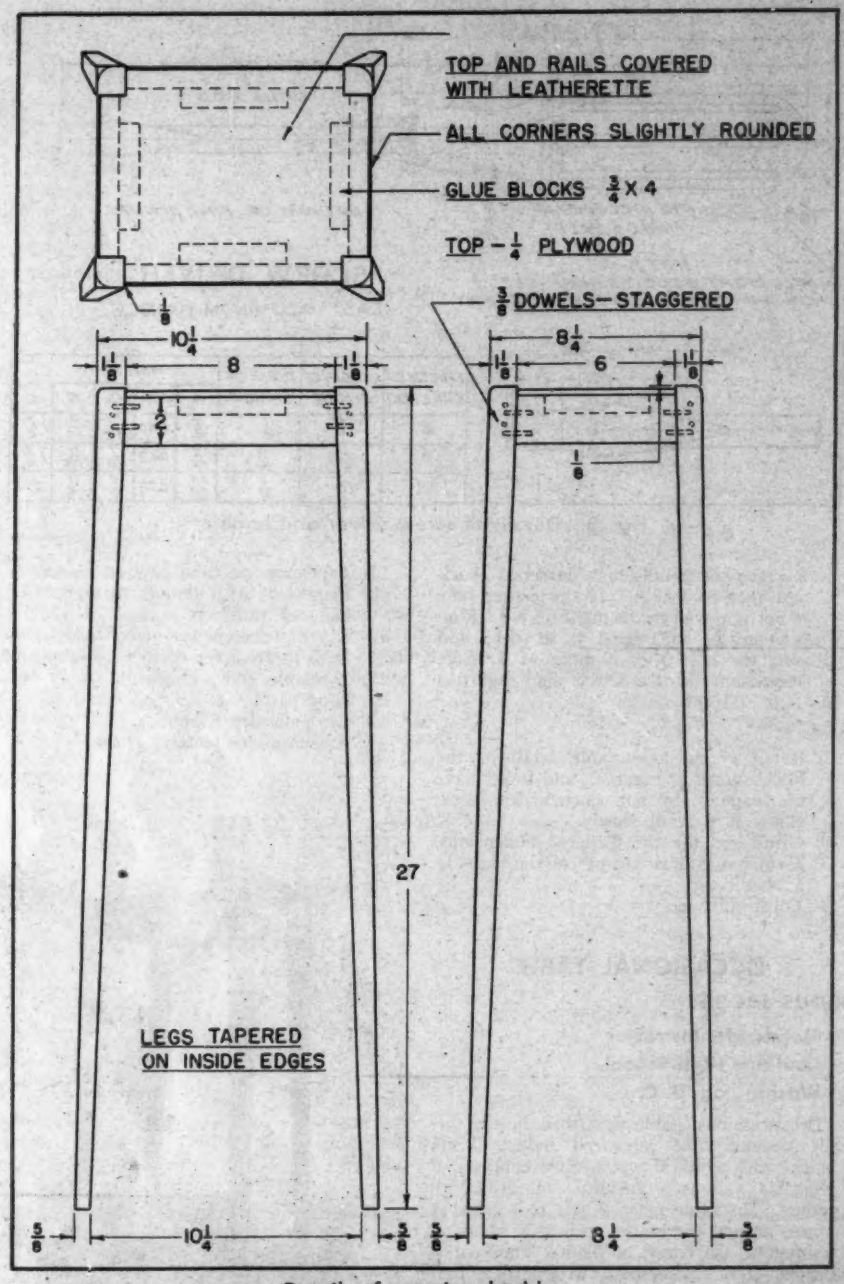
1. Make original design or sketch accompanying working drawing.
2. Draw full-size leg and rail.
3. Plan procedure.
4. Make bill of material.
5. Have drawing, bill of material, and procedure checked by instructor.
6. Cut out stock for legs.
7. Taper legs on table saw or jointer.
8. Plane legs with smooth plane.
9. Cut out rails and ends.
10. Lay out centers for dowel holes.
11. Drill dowel holes with No. 6 auger bit.
12. Assemble ends; check.
13. Glue parts together and clamp.
14. Let ends dry 6 hours.
15. Assemble completely; check.



Occasional table by Rufus Jacoby

BILL OF MATERIAL

No. of pieces	*Part*	*Size*
4	Legs	1⅛ x 1⅛ x 27 in.
2	Rails	1 x 2 x 8 in.
2	Rails	1 x 2 x 8 in.
	Dowel rod	3 ft. of ⅜-in. dia.
1	Top	¼ x 8¼ x 10¼ in. plywood or end of orange crate
		13 x 15-in. upholsterer's end leatherette



Details of occasional table

16. Lay out top. Use ¼-in. plywood or masonite.
17. Glue and nail top to rails. Round off edges.
18. Sand the legs and finish with oil.
19. Cut leatherette and glue it in place.
20. Wax entire job.
21. Evaluate.

To get the angle at the rail ends, draw a full-size view of one leg and rail. Set the bevel square on this angle at the rail end.

Any clear lumber available is satisfactory; clear white pine or walnut are suggested. Assemble and clamp to check for squareness before gluing. Check the diagonals of top, bottom, and sides. Finish with several coats of boiled linseed oil and wax.

Leatherette ends may be purchased at small cost from upholsterers. The color of the leatherette should contrast with the color of the wood. Good quality leatherette is soft and pliable.

Several kinds of paste may be prepared to glue the leatherette to the wood top. Flour paste is a cheap, satisfactory adhesive. It is prepared by adding warm water to wheat flour and stirring to the consistency of thick cream. If a stronger paste is desired, take 3 parts of wheat flour and 1 part plastic wood glue; mix well and add warm water, stirring to a consistency of thick cream.

Wallpaper paste is also a good glue for leatherette. It is prepared by adding powder to water and stirring until the proper consistency is obtained.

When applying the paste, saturate the cloth back of the leatherette and put a thin coat on the wood top. Smooth the leatherette with a stiff brush or with a piece of cloth rolled into a ball. Wipe off all excess glue with a damp cloth; wax the leatherette after the glue is dry.

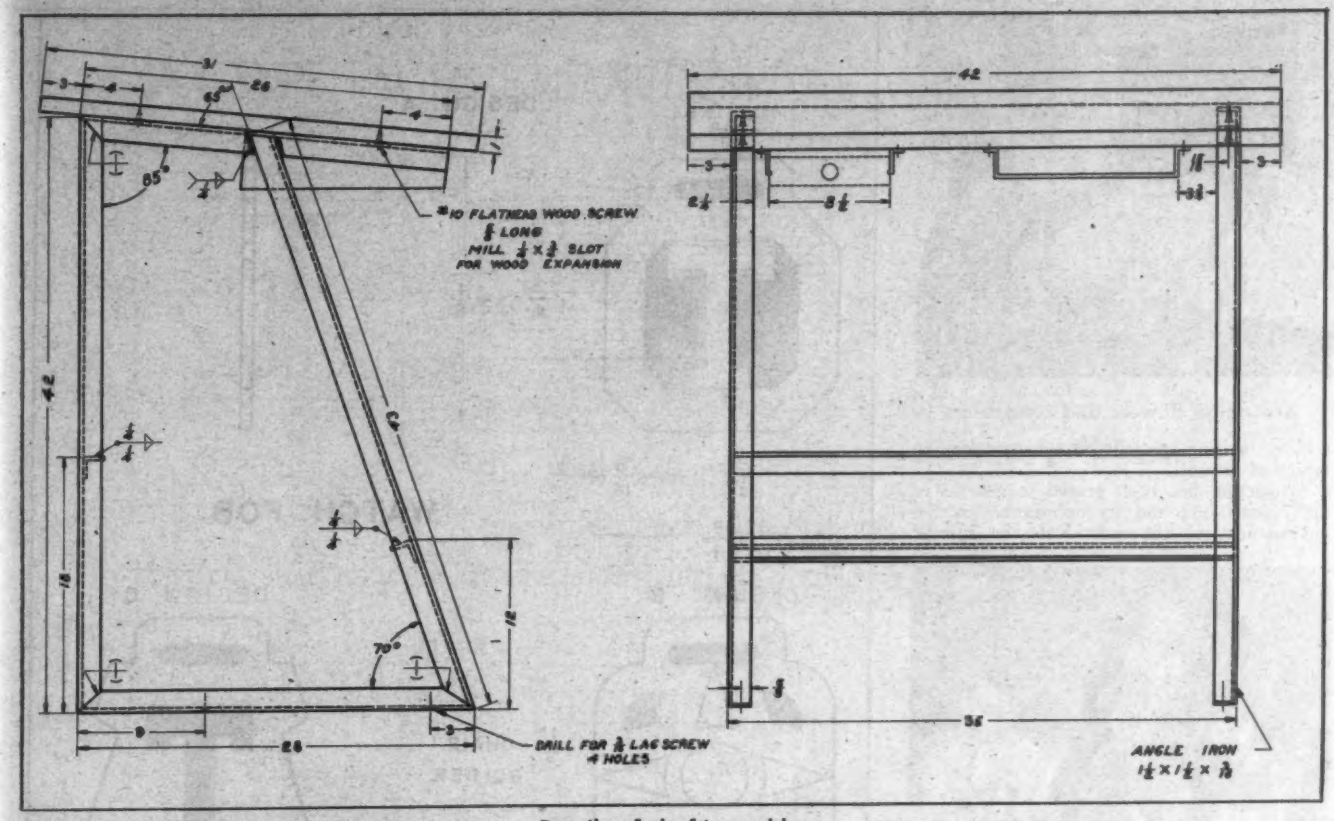
DRAFTING TABLE

FLOYD C. ALLISON
Head of Drafting Department
Munger Trade School
Detroit, Mich.

The drafting table described herein can be constructed at low cost in any school that is supplied with welding equipment. It is simple in design, has an all-metal base, and is rigid and durable. With the use of jigs it can be rapidly assembled.

Drawing table by Floyd C. Allison

The design originated in the drafting department of the Munger Trade School, Detroit, Mich. Thirty of these tables were made in the welding shop and installed in one of the drafting rooms of the school. Angle iron, the only available material, was used for the base and with strongly welded joints



Details of drafting table

Front of drafting table

FIXING UP THE HOME

BETTY BEAUBIER FOX
Adult Homemaking Instructor
Public Schools
Jackson, Mich.

Three hundred and fifty women, and a few men, have learned the art of improving a home during the past eight years, through an adult class in home decoration which has been one of the curricular offerings of Jackson Public Evening Schools.

These people have come from varied walks of life — businessmen who owned their own stores or were in managerial positions; the more numerous housewives who have remodeled their homes architecturally and decoratively as a result of this training.

Mixing paints

Some of the areas covered have been the study of various types of houses and rooms in modern home building; ways and means of modernization of old interiors to make them more attractive, convenient, and livable; the theory of color, and its application to interiors —walls and floor coverings, upholstery fabrics, draperies and curtains; the selection of furniture, and the study of appropriate arrangement; the history of decorative motifs as applied to both furniture and fabrics; and the importance of budgeting in the buying of home furnishings by the consumer. The work has been enriched many times through visits to the furniture stores and decorating shops, proved very satisfactory. A suitable paint improved the appearance and made an attractive room. The tables were fastened securely to the floor with screws inserted through holes in the base.

The table height was fixed at 42 in., which is a good average height. It was not equipped with the usual adjustable device. Experience has proved that it is seldom necessary to raise or lower the height of the top or change the slant of the drawing board for schoolroom use. Several factors were considered in deciding the size of the top. They were: capacity of the room, number of students, and the size of drawings to be made. The proportion of the base conformed to the size of the top.

Arranging furniture

Arranging flowers and ornaments

and by inviting specialists to discuss specific topics of interest.

Instruction has been geared in general to art appreciation and its application to the environment of the individual, the specific

Mixing paints and arranging scrap book inserts

aim having been principles of art in relation to the home, which is in keeping with the title of the course.

Many interesting projects have been initiated, developed, and completed through the work of the students in this course.

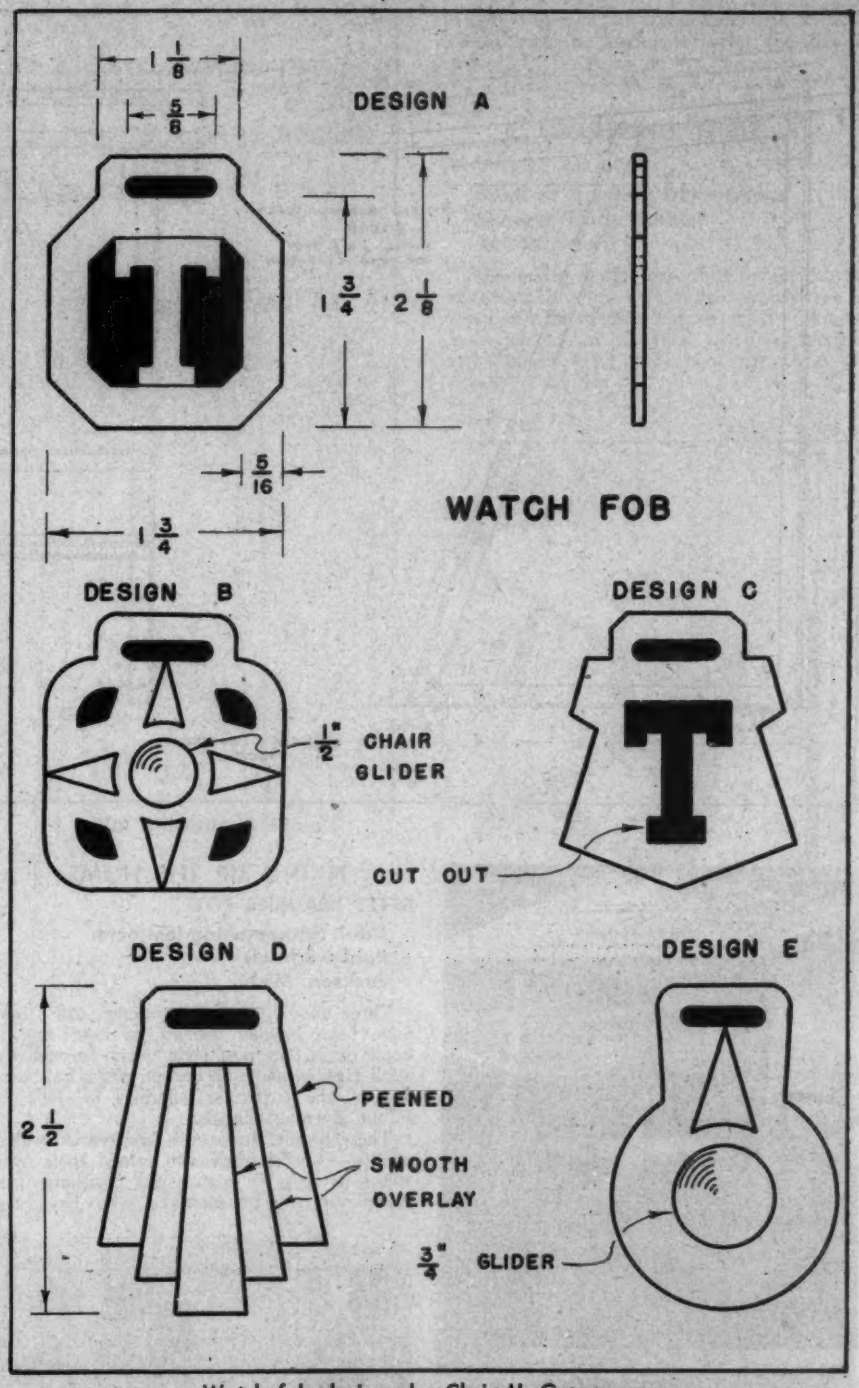
ORNAMENTAL TIN CRAFT

CHRIS H. GRONEMAN
Industrial Education Department
A. & M. College of Texas
College Station, Tex.

(Continued from page 226 of the May, 1945, issue)

Watch Fob

A watch fob is the constant companion of anyone who carries a pocket watch. Designs for such ornaments are limited only by the ingenuity of the craftsman. The designs illustrated herewith are but a few of the many ideas which may be used. The fob can be personalized by the piercing or overlay of initials or monograms, or it may be made ornate by intricate piercing and overlay patterns. The sizes shown are limited only by an appropriate taste, and can be altered to suit the craftsman. It is suggested that the stock for this project be of double thickness sheet tin sweat-soldered together to give added weight and thickness. This particular project may be copperplated or finished in any of the many novelty lacquers or enamels in colors.



Watch fob designs by Chris H, Groneman

Bill of Material for Design A

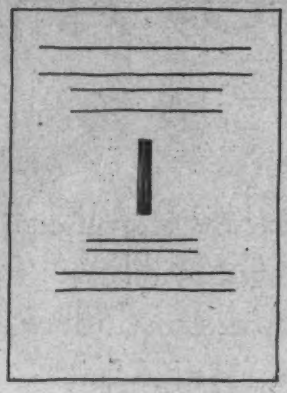
No. of Pieces	*Item*	*Size*
2	Sheet tin	2 x 2¼
	Solder, flux, steel wool	

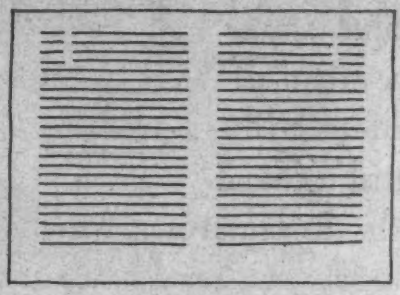
Tools: Asbestos sheet, brush, carbon paper, copperplating setup, emery cloth, files, flatiron, heating device, jewelers' frame and blade, lead weight, pencil, rule, scriber, soldering copper, tempera water color paint — yellow, and tin snips.

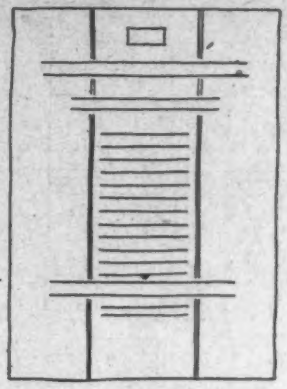
Procedure

1. Use the design shown, or develop an original design.
2. Cut out 2 pieces of tin stock.
3. Solder one side of each piece.
4. Sweat both pieces together with hot flatiron. Weight the soldered parts together immediately as more is sweated.
5. Apply coat of yellow tempera water paint to one side of sweated piece for design transfer.
6. Lay design sheet and carbon paper over painted portion and trace design.
7. Drill holes and cut out fob with jewelers' frame and blade.
8. File and dress edges with emery cloth.
9. Rub watch fob with steel wool and prepare for plating.
10. Apply thick coating of copper.
11. Polish project with steel wool. Use cloth to prevent touching metal with hands.
12. Apply coat of clear metal lacquer and allow to dry.

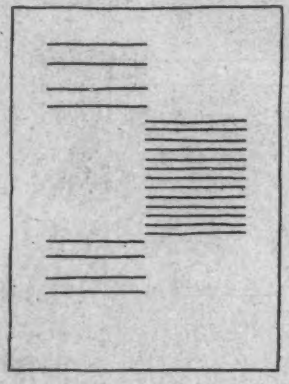
CAN TYPE PAGES BALANCE ON THE VERTICAL AXIS?

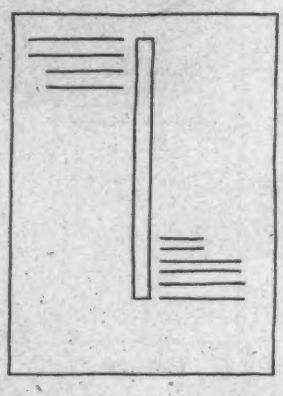


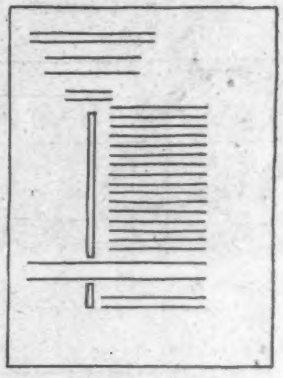




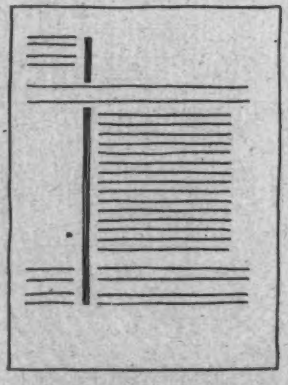
The type mass may balance equally on each side of a central axis, such as a rule or ornament, center of a double spread, or a column of type

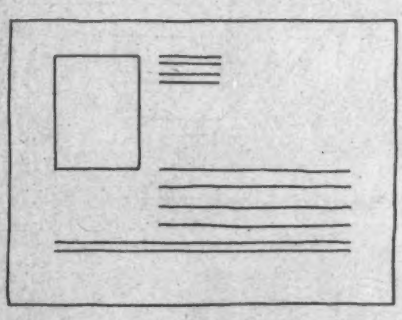


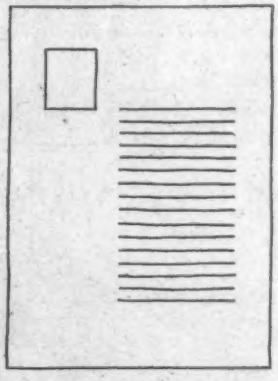




Asymmetrical balance may place equal weights on each side of an implied or real central axis, or the axis may be shifted to one side.



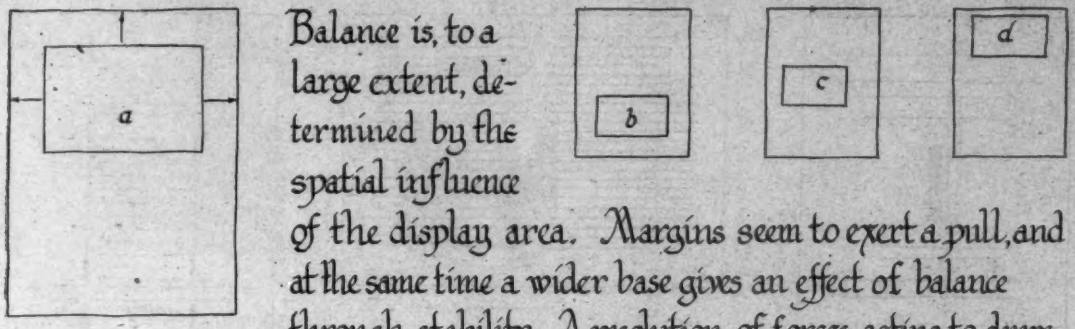




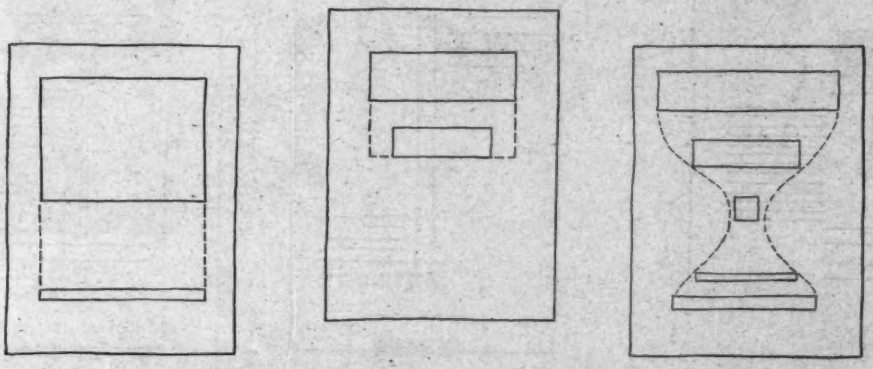
Here the "steelyard" principle of balance is employed. The axis becomes a line of motion leading the eye from one part to another.

Plate 58. Design course by Burl N. Osburn, director of industrial arts, State Teachers College, Millersville, Pa.

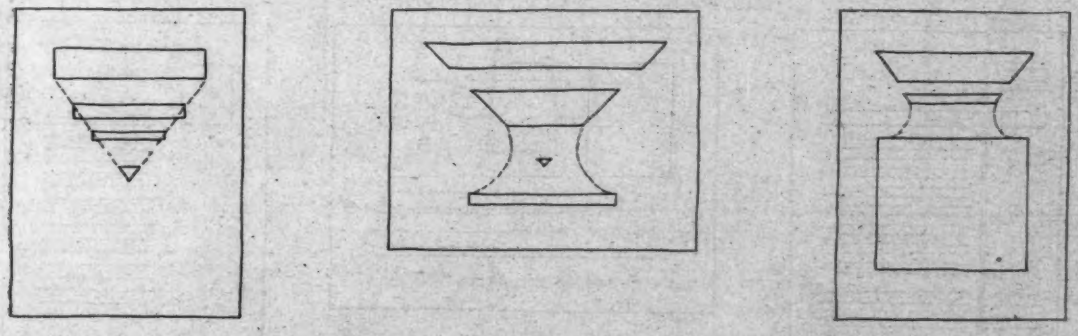
HOW IS A REGULAR TYPE MASS BALANCED?



Balance is, to a large extent, determined by the spatial influence of the display area. Margins seem to exert a pull, and at the same time a wider base gives an effect of balance through stability. A resolution of forces acting to draw type mass *a* toward top and sides would bring the mass to a state of equilibrium at a point where sides are equal, and the top the same or slightly larger. Examples *b, c, and d* do not provide that resolution of forces and stability of base



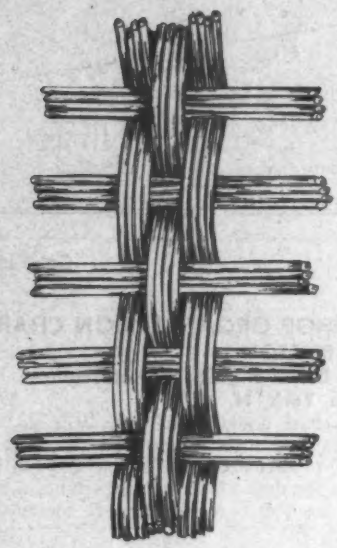
When the mass is small the pull of the base is relatively weak. When the foot is small the pull exerted by the lower margin is less than that of the other sides.



The eye tends to arrange the masses of type into an organized unit, and to seek a resolution of forces that will balance the whole on the page.

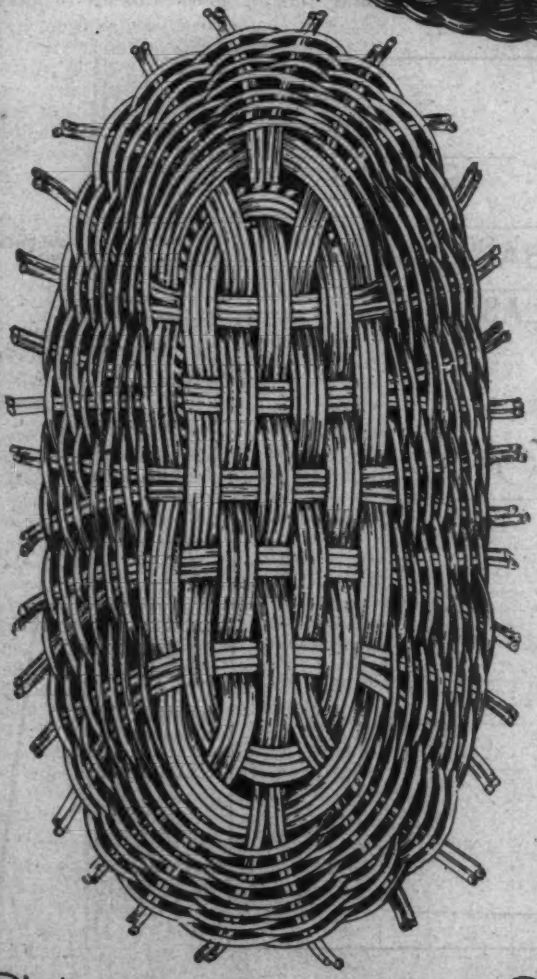
Plate 59. Continuation of design course by Burl N. Osburn, director of industrial arts, State Teachers College, Millersville, Pa.

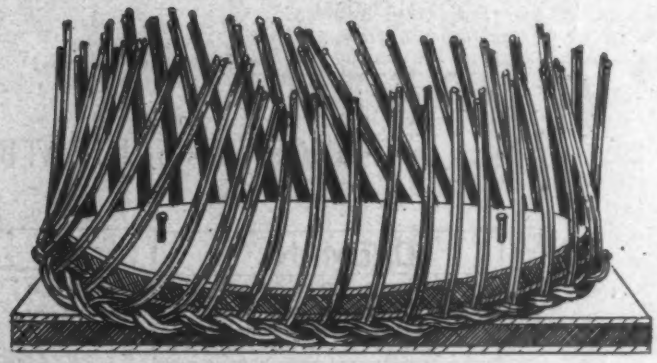
A UTILITY BASKET



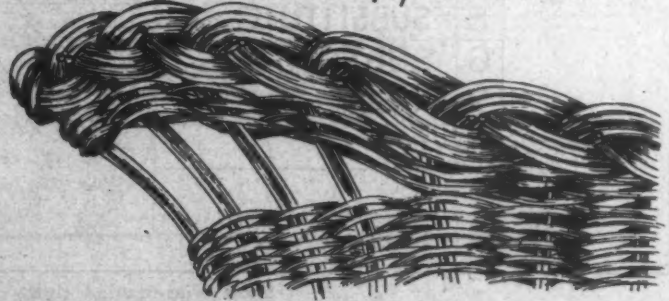
① Spokes interwoven for base

③ Finishing edge of the base



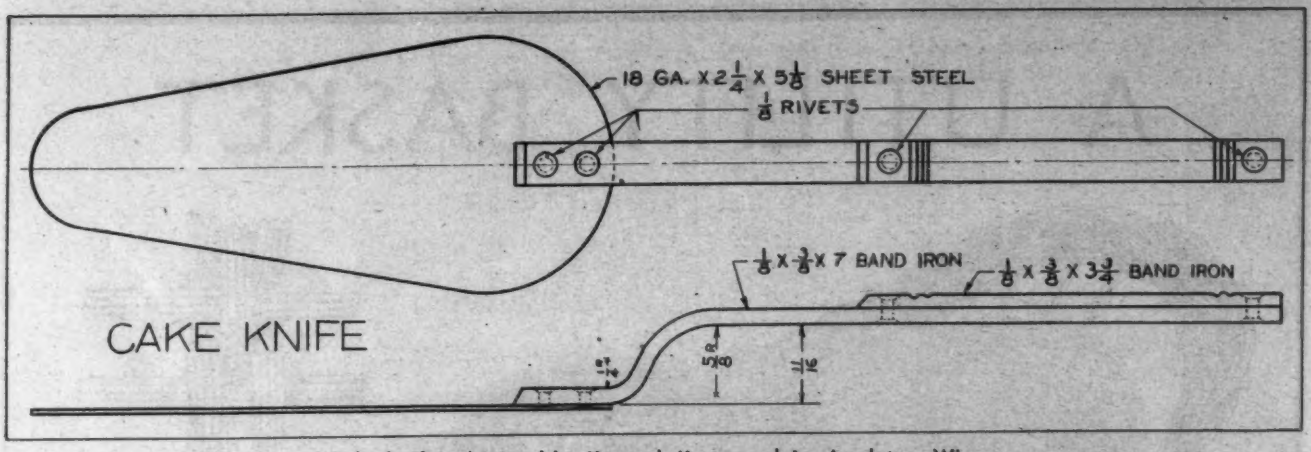


④ Base nailed between plywood blocks



② Weaves used in making base ⑤ Openwork at end of basket. Braided edge

Utility basket submitted by Louis V. Newkirk, director of industrial arts, Chicago, Ill.



Cake knife submitted by Kenneth Kuemmerlein, Appleton, Wis.

THE SHOP ORGANIZATION CHART

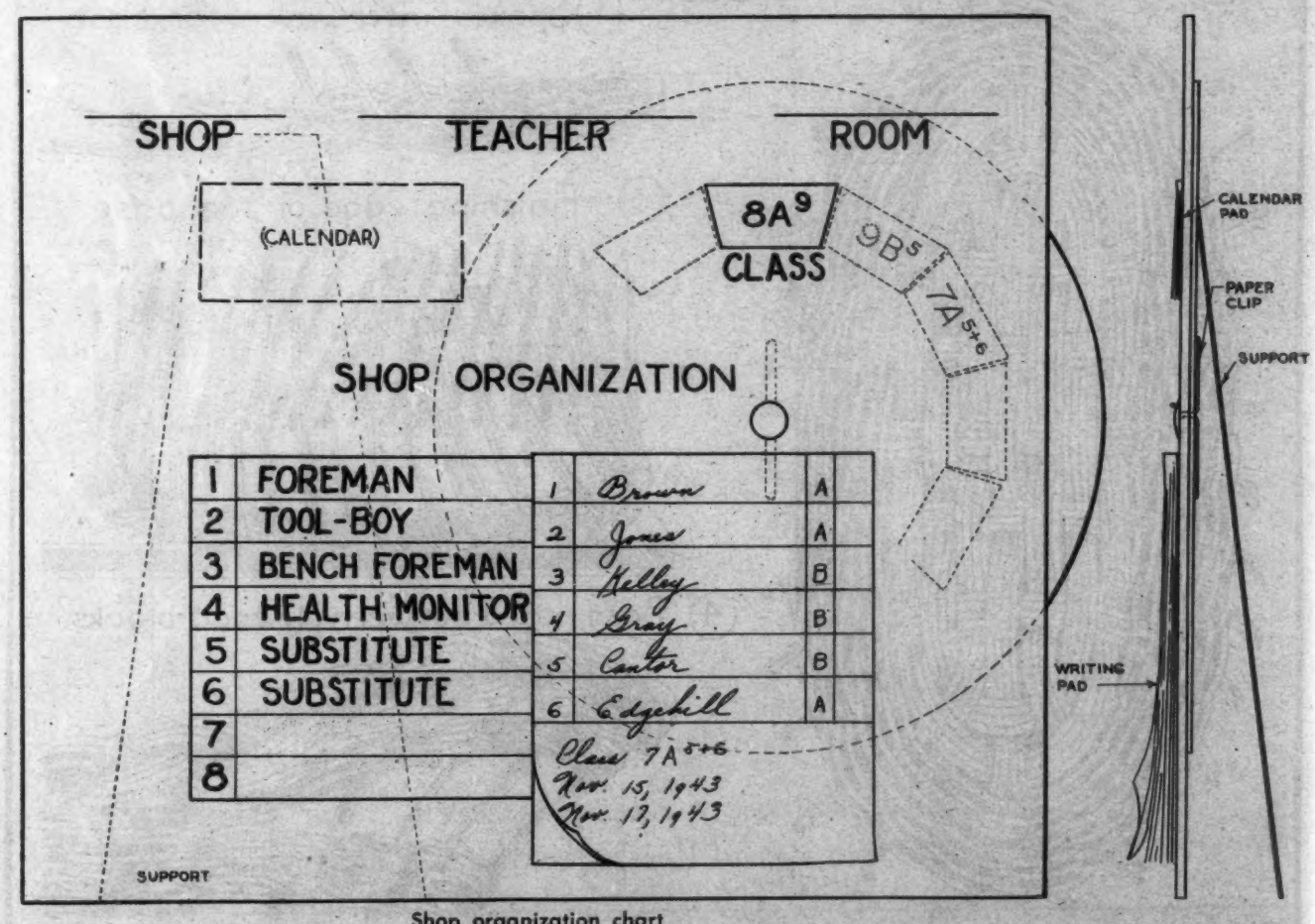
A. G. BELESON
The Bronx High School of Science
New York, N. Y.

The chart described herewith will aid all shop teachers in setting up their shop organization. It is compact and simple and can be kept on the desk where the instructor and the pupils can see it at all times. It contains a calendar, record of the various classes that come to the shop, and a little pad upon which are recorded the names of the various students who have served in the different jobs. Each week the rotation of positions takes place. The weekly system seems to work out the best. With six or more positions available each boy receives a chance to serve in the various capacities. Although only six positions are shown, other instructors may find it desirable to add more jobs to their shop organization.

The little pad is replaceable — it contains the shop organization, the date, the class, the number which indicates the jobs held by the student, and the rating of the student for his effort in performing his job. The following is an example of what each of the boys must do.

All boys in the shop must clean up and put away their tools and work.

1. *Foreman:* Opens locker containing work; distributes work; checks attendance; returns work of absent students to locker; checks return of all work at close of period; closes locker; and checks shop to see that all work, tools, and drawings are returned, and that everything is in good order.



Shop organization chart

2. *Tool Boy:* Opens toolroom; hangs up all tool racks; inspects for missing and broken tools; and places hand-tool racks on workbenches. At the close of the period he checks the tools as they are returned and reports all missing or broken tools to the instructor. Then he locks up the toolroom.

3. *Bench Foreman:* Prepares soldering bench; places coppers in furnace; lights pilot lights in furnaces; and puts soldering trays in proper places. At the close of the period he shuts off all gas burners; returns coppers and soldering trays to proper places; collects all scraps of solder; and brushes off bench.

4. *Health Monitor:* Checks room for proper ventilation (according to specification of the instructor); checks benches and floor for any sharp scraps of metal; checks room for proper lighting; sees that no scraps of paper or other foreign matter litters up the shop; and checks the boys for loose ties and sleeves when using the furnaces or machines, and that goggles are worn at the grinder.

5. *Substitute:* Takes charge of the distribution of aprons, and the checking of the return of the aprons at the close of the shop period. He also fills any vacancy caused by any absent boy holding one of the shop organization positions.

6. *Substitute:* He replaces any absent boy in the organization; greets visitors; and explains to callers what the boys are doing in the shop.

The organization chart shown has been found very handy, and has helped to make the operation of the shop more efficient. The boys' ratings are filed away so that an accurate record is kept of what each boy has accomplished. Cooperation and shouldering of responsibilities are two of the things that students develop through this method.

The disk containing the classes is rotated as a new class appears. It can easily be replaced when it is used up. The little pad is also replaceable.

VICTORY PEG GAME

ISADORE M. FENN
Chicago Vocational School
Chicago, Ill.

Here is a project which students welcome enthusiastically. They enjoy making and using this game. Many students ask their instructors for permission to make extra victory peg games to send to their brothers, sisters, or friends in the armed forces.

This entertaining and patriotic game is also welcomed by instructors because it allows for a variety of valuable experiences, is a morale building project, and can be made from scrap material with the use of a few common tools. It can be made in any size, larger or smaller than the one shown in the illustration, depending upon the size of the material available.

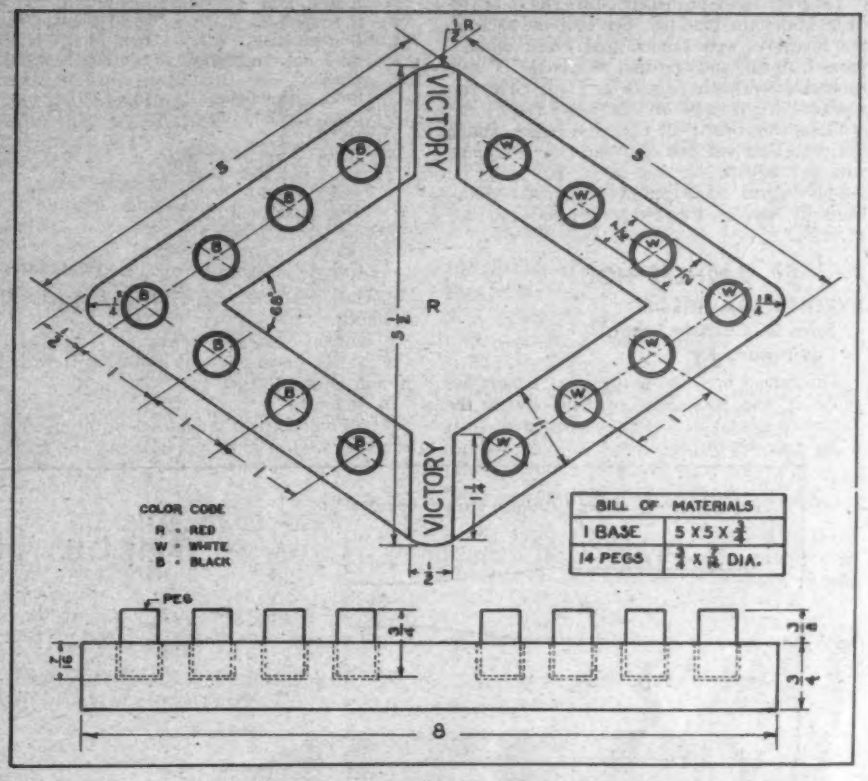
Experiences: blueprint reading, following directions, layout, boring, sawing, squaring, sanding, finishing.

Steps in Construction:

1. Study the drawing and directions.
2. Make a layout on the material furnished.
3. Bore the holes for the pegs.
4. Saw and true up the base.
5. Make pegs from dowel rods.
6. Smooth the base and pegs with sandpaper.
7. Finish the game with the proper colors according to the directions:

a) Number one end of each peg of both sets, 1 to 7 inclusive, with India ink or paint.

b) Paint one set of pegs white and the other set blue.



Victory peg game by Isadore M. Fenn

c) Paint the base with the colors designated by letters — see drawing and the color code. One V is blue, the other V is white, and the center of the base and the background of the word *victory* is red.

d) The word *victory*, which faces each player, is painted white.

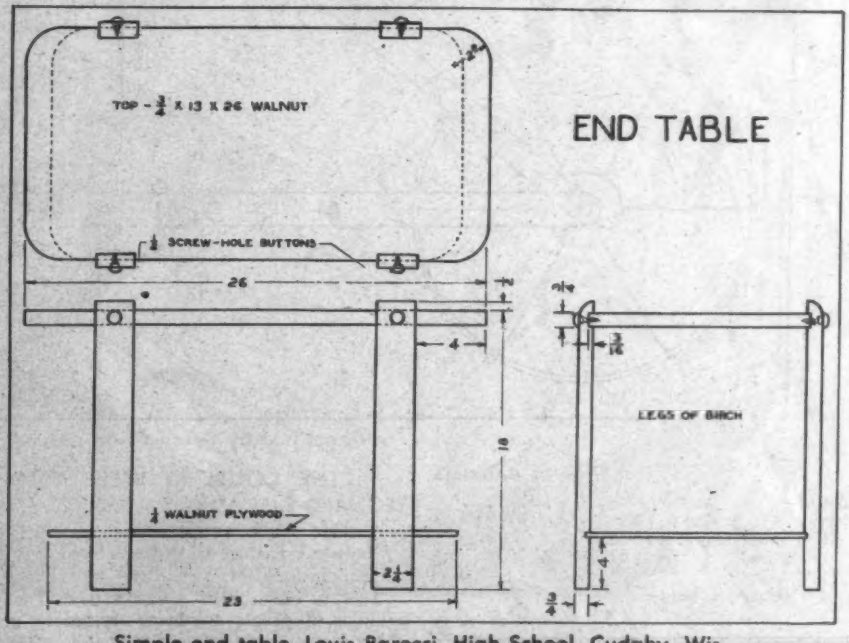
Rules of the game:

Each player places his set of pegs, numbers down, in the holes in his V. Then each player takes turns picking a hidden number from the other player's V. The first player to get the sum of 21, or nearest to it, wins.

A CLEAN GLUE BENCH

EVARETT I. RUSS and
S. S. PALESTRANT
Bronx, New York City

In a shop, the appearance of the glue bench frequently is a sore spot, because the drippings of the glue are likely to make the bench the dirtiest place in the shop.



Simple end table. Louis Barocci, High School, Cudahy, Wis.

To keep the glue bench clean cut a board to fit under the glue pot. See that the face of the board is well sanded and finish with a varnish finish, and see that the latter is well rubbed down with pumice and oil. Give the surface several coats of wax, paste type.

Place this board on the glue bench under the pot. You will find that the glue drippings will not adhere to this board but may be readily wiped off when dry. Renew applications of wax as frequently as need and use dictate.

WHEEL HOE

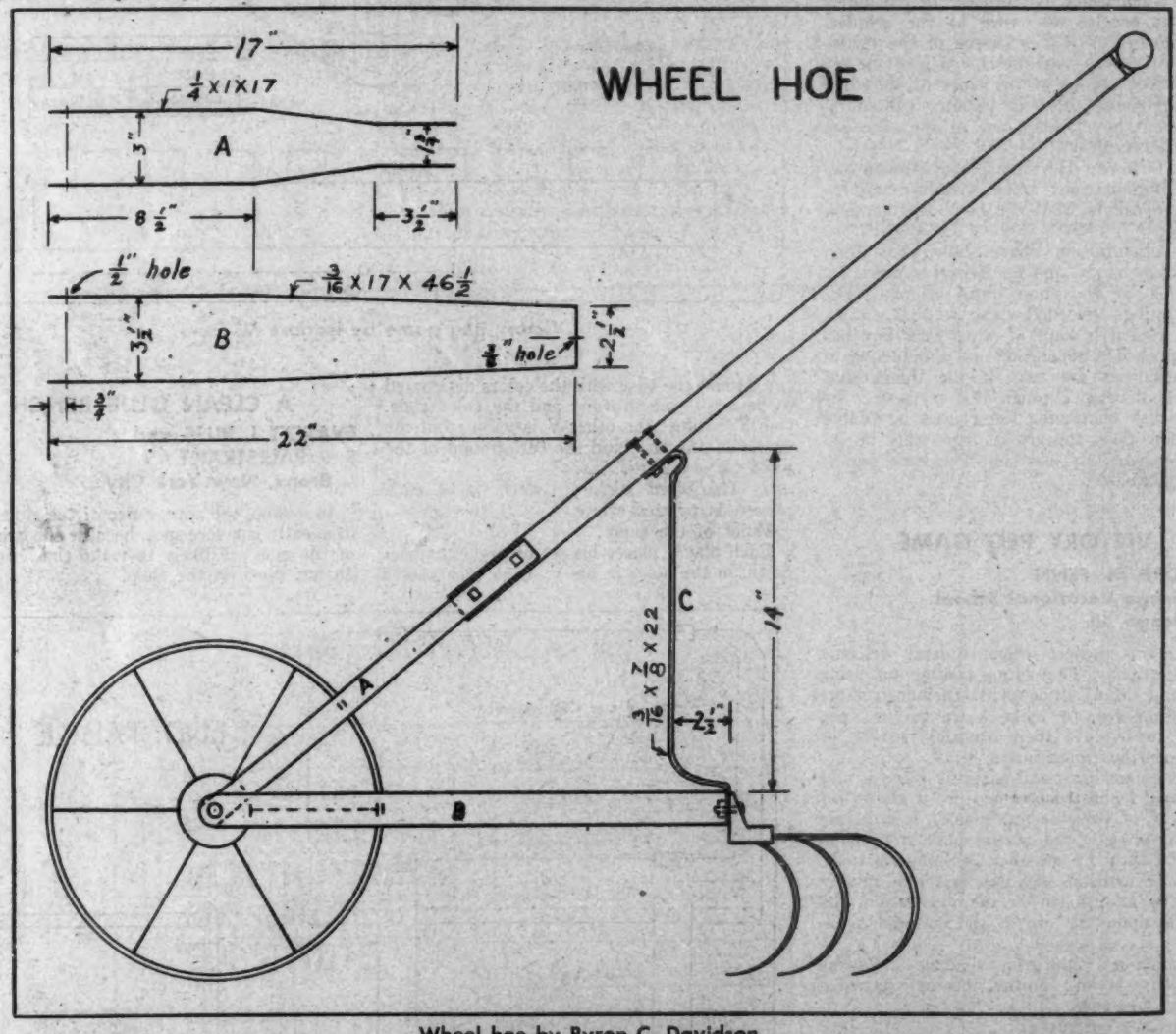
BYRON C. DAVIDSON
John G. Carlisle School
Covington, Ky.

This wheel hoe was designed and built because it was impossible to buy one at the hardware stores. It is easily constructed, costs little, and works perfectly.

2	*A* strap iron	¼ x 1 x 17 in.
1	*B* strap iron	3/16 x 1¼ x 46½ in.
1	*C* strap iron	3/16 x ⅜ x 22 in.
1	Bolt, nut, and locker washer	⅜ x 1¾ in.
2	Bolts (squarehead), nuts, and lock washers	¼ x 1¾ in.
2	Bolts (squarehead), nuts, and lock washers	¼ x 2½ in.
	Hoe attachments	

Procedure

1. Cut, drill, and shape parts *A*, *B*, and *C* as shown.
2. Thread each end of axle for 1½ in. Insert axle in wheel and put a nut on each side of hub with flat side out.
3. Assemble.
4. All metal parts should have a prime coat of red and oil. The second coat may be green.



Wheel hoe by Byron C. Davidson

BILL OF MATERIALS

No. of pieces	*Part*	*Size*
1	Lawn mower handle	
1	Wheel	14 in. dia.
1	Axle	½ x 5 in.
4	Hexagonal nuts	½ in.

THE COUNTRY WEEKLY

LEONARD E. SCHMIDT
Lincoln Hall Annex
Bronx Vocational High School
Lincolndale, N. Y.

This is the age of specialization. Today, millions of people are being trained to perform just one operation, and that is often a very small one. While we do not get down to extremely small operations in the printing trade, we do find the majority of the workers doing one kind of work day after day. There is little doubt that most workers can do the same task over and over again without being depressed, but there are still many who would rather do many different operations during the course of the day, and who take jobs, even at lower pay, just for the chance to do varied work.

If this is true of men in the trade, then it must also be true of the boys who are in our schools. What about them after they leave school? While they are still students, they naturally have the chance to try their hands at the different parts of the trade so that they may better decide which branch they are better suited for. Is there a place for the boys who can never be happy doing the same thing every hour of the day? There is — the country newspaper shop.

If you have ever lived in the country, or spent any time there, you have no doubt come in contact with that all-important part of American life — the country weekly. These papers, usually four, six, or eight pages in size, are to be found in almost every town in the country. In them you will learn of Mrs. Jones's new baby, of the church's need for funds, of the fire that the local volunteers fought recently, and other items of interest only to those who live in the community covered by the paper. The circulation is often small. The writer recalls one paper on which he worked which had a circulation of only 165.

Many of these shops are located in a frame building, the printing plant taking up the ground floor and cellar, and the owner-editor living upstairs. Usually, two, three, or four men are employed to take care of the work. Each worker knows how to do more than one thing, and often can do all the different phases. Here is a place for the boy who wants to get away from the steady grind.

Let us look into one of these small newspaper shops, and see what we find. The shop I shall take you to is located in Mahopac, N. Y., about fifty miles from New York City. This shop publishes two papers, one for northern Westchester County, and another for Southern Putnam County. Although these sections join each other, it is necessary to maintain two papers in order to get the legal notices and town work from each county. The main equipment consists of a Miehle hand fed cylinder on which the paper is printed, a Little Giant automatic small cylinder press on which the smaller jobs and long runs are placed, a 12 by 18 jobber, a linotype, and a casting box. To these can be added a saw trimmer, stitching machine, and the usual stock of type, galleys, and the like. Also to be found is the large wood type for printing posters.

At the present time, the boss and one man take care of all the work, assisted by a linotyper who comes in a few days a week to set the copy for the paper and to do such other jobs requiring machine work. As an example of what a worker on a country newspaper does, let us review a day in this shop, other than the days on which the papers are printed.

The first job on the particular day chosen is to set and print 300 wedding invitations. This is completed and the next job is 700 tickets for a movie show that is held twice a week during the summer months. While locking this up, the boss arrives (he is also town surveyor, and must divide his time), and asks his assistant to lock up four pages of the local phone directory for the *Little Giant*. After that has been done the form is put on the press, and a sheet is pulled, then the corrections are made. When that has been done, the assistant turns the press over to the boss who runs it, and the next four pages are put on the stone. Then the assistant is free to return to the ticket job.

During the running of these, the boss is called into the office to answer the phone or see customers, and the jobber is shut off so that the assistant can keep the directories going. Somewhere along the line he eats his lunch. Frequently this is done while watching the press. This is not expected, but there is a great deal of work that has to be gotten out. Between runs of the directory, the tickets are finished. Then there are some posters and envelopes to be printed. Surely enough variety for anyone. But wait, there's more. Let's look into the shop on Wednesday.

Wednesday, among other things, is casting day. After the mail has been opened (it is always necessary to wait that long because some mats may be in the morning's mail) all of the mats (paper matrixes from which the cuts are to be cast) are gathered and a sheet of paper about 2 in. wider than the mat is pasted to the bottom of each. This will prevent the hot metal from running under the mat when it is in the casting box. Then a fire is started under the metal pot, and the casting bars are set in the box, and the casting box is preheated. While the box is getting hot, the first mat to be cast is placed on the cover of the metal pot to dry out. A piece of wood placed on it keeps it flat.

Then the mat is placed into the casting box, the casting bars, which are a little under type high are secured in place on three sides of the mat, and then the metal is poured in. The form is allowed to stand about five minutes, then the box is opened and the cut taken out. Since everything is very hot, gloves must be worn at all times while casting. The rest of the mats are cast in the same manner. After they are cool, the cuts are trimmed to size on the saw trimmer. Any metal left after the last mat is cast is poured into molds which are used on the linotype machine.

Thursday is newspaper day. While the printing is started on Wednesday, Thursday is the day the paper gets on the stands and in the mail. Besides acquiring experience as a printer, the beginner has a chance to go out and sell ads for the paper, and to write a column for the community for which the weekly is printed.

Does all of this sound interesting? It has been for many, and this type of training is heartily recommended to any young printer who hates routine. In the shop in which the country weekly is printed there is seldom a dull or idle moment.

TRACING MADE EASY

BOB HEGEMAN
Waukon, Iowa

If one has a large amount of tracing to do, he will find it greatly simplified if he builds a tracing board such as the one shown herewith.

The top of the tracing board is plate glass, sunk flush in a wooden frame. The drawing to be traced is tacked or taped to the top, and the paper upon which it is to be copied, is fastened directly over it.

Then the lights below are switched on, and aided by a shiny tin reflector, show through the plate glass window, making both sheets translucent. It is then very easy to follow the lines to be traced. The size and shape of the reflector is governed directly by the pitch of the board that is desirable. Several holes must be drilled on the sides and top of the tracing board to allow for air circulation.

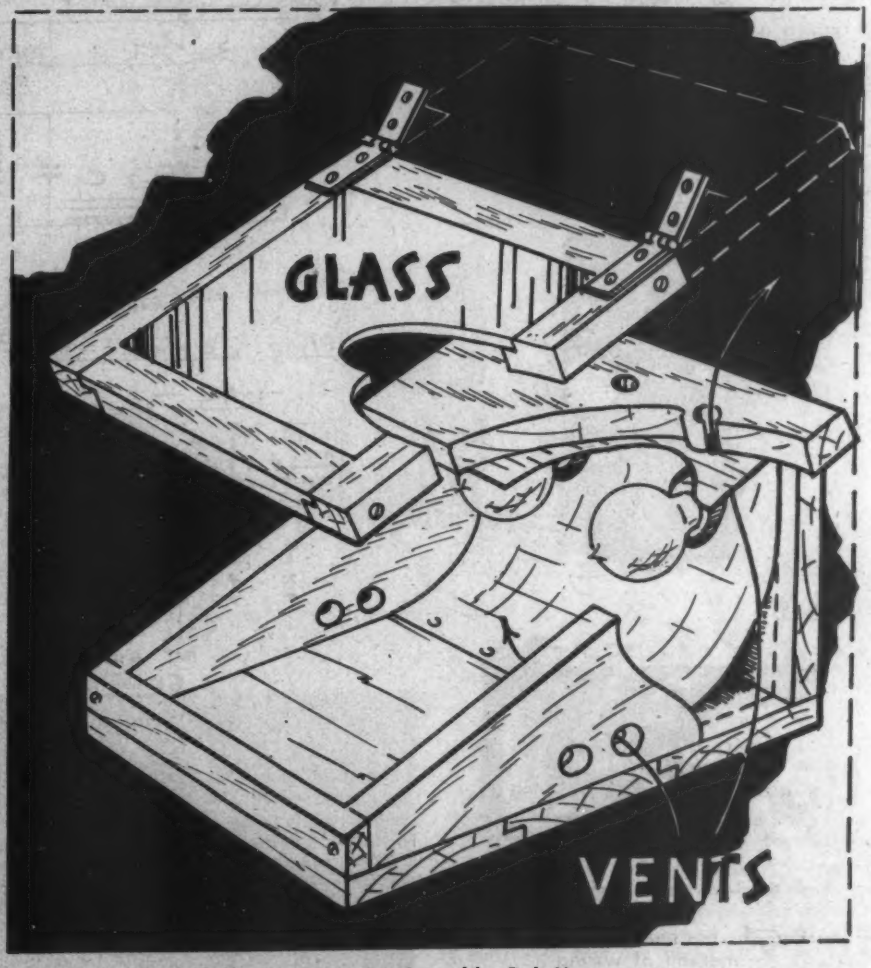
This type of tracing board also will be found very useful for tracing sketches on mimeograph stencils.

LUBRICATING THE DEAD CENTER

EVARETT I. RUSS and S. S. PALESTRANT
Bronx, New York City

The dead center of the wood lathe offers a problem in lubrication, particularly today, when hard, close-grained woods are not readily available and most turning must be done with soft woods. The turner is torn between over-lubricating with the resulting spatter and stain, and under lubricating with the resulting burnt dead center and job.

The authors have found that the use of yellow laundry soap solves the problem so successfully that they use it to the exclusion of all other dead center lubricants. The soap has more body than grease and stays in the dead center cup. It also quickly forms a hard black cake at the dead center end of the work preventing the dead center from burning into the soft wood.



Transparent tracing board by Bob Hegeman

COMBINATION POWER SUPPLY

JAMES W. HOSKINS
Palo Alto, Calif.

At this time the high school that has retained a radio instructor, even though he may be forced to use salvaged materials, is not only performing a great service for the boys who will soon enter the armed forces from their high school classes, but the younger boys will look forward to the time when they can go on with the hobby they may have at home. This is a transition period which presages great improvements. Probably many junior high school students are interested in radio. They should be made to realize the demand in this coming field, and offer training for this type of lifetime job. Our shop classes and vocational schools should teach all they can along this line because there is a bright future in this field for the youth of today.

It is with this viewpoint in mind that the author is submitting the following plans for a combination power supply. This unit has several advantages over the regular a.c. operated power supply in that it may be operated from six volts d.c. or 115 volts a.c. By being able to operate the power supply from two types of supply voltage it is possible to operate such equipment as receivers, small sized transmitters, and medium sized amplifiers in any location not equipped with 115 a.c. current. At the present time this type of power supply is being used by the War Emergency Radio Service since they are required to operate their equipment from either supply voltage. Other advantages are the small size, compact arrangement, and it is well shielded so it cannot cause electrical interference.

Figures 1, 2, 3, 4, and 5 are self-explanatory and show the finish that an amateur may obtain with careful work.

FIG. 1

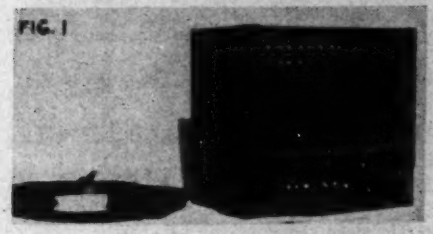


FIG. 2

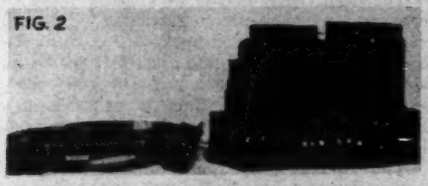


FIG. 3

Fig. 1. Front view with dust cover on a.c. input cable assembly
Fig. 2. Front view with dust cover removed d.c. input cable assembly
Fig. 3. Rear view with dust cover removed

FIG. 4

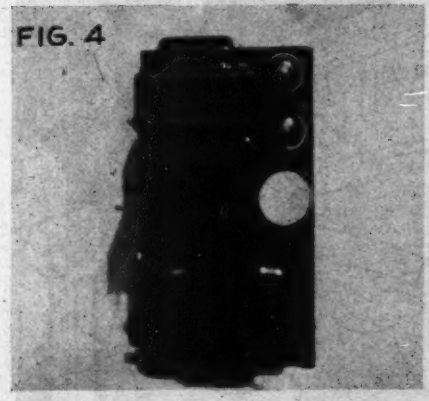


FIG. 5

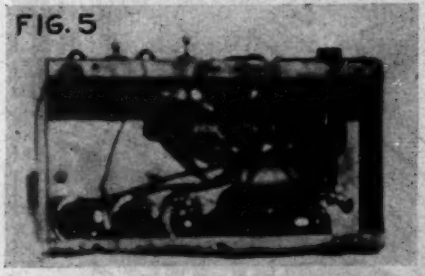


Fig. 4. Top view showing layout of parts
Fig. 5. Bottom view showing method of wiring

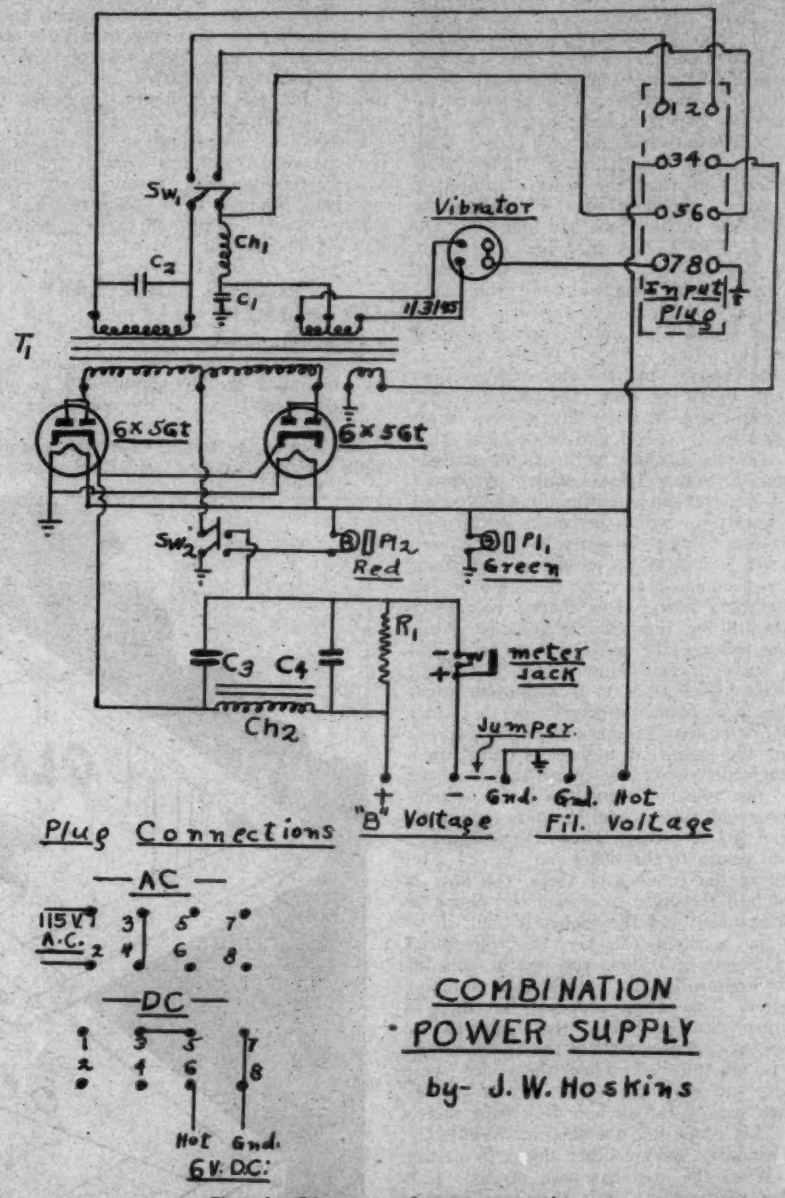


Fig. 6. Diagram of power supply

Figure 1 shows the front view of the unit with the dust cover on. From this view we notice that all of the controls and plugs or sockets are located on the front of the chassis so it can be used in compact spaces. The controls across the front from left to right are:

a) The red pilot light (or PL_2)
b) The plate voltage switch (or SW_2)
c) The green pilot light (or PL_1)
d) The filament voltage switch (or SW_1).

Over the plate voltage pilot light and switch is mounted a name plate reading *plate voltage*. Over the filament voltage pilot light and

(Continued on page 273)

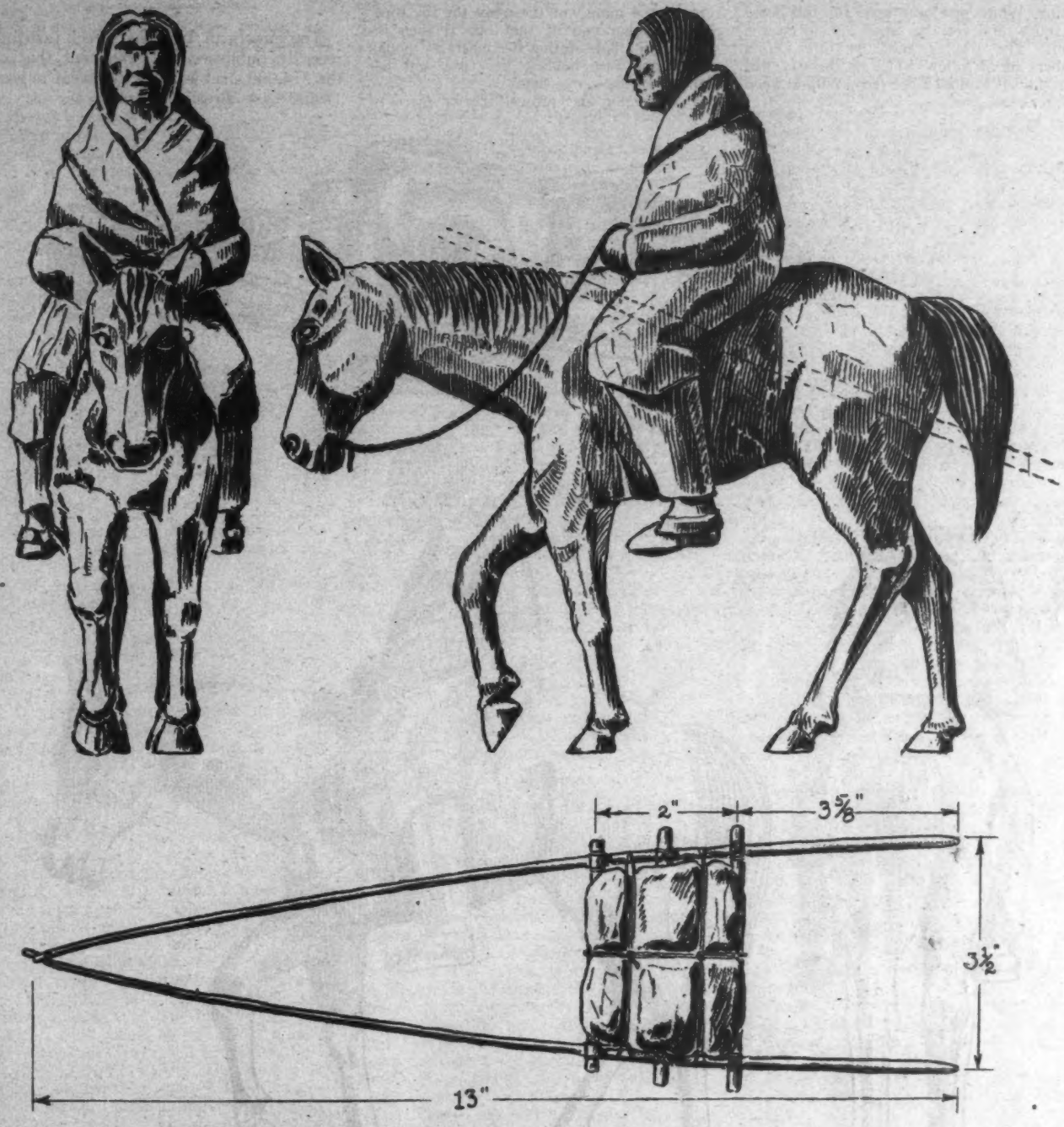


Fig. 178. Full-size patterns of details

Fig. 177. The travois on the move

WHITTLING-JACKKNIFE TECHNIQUE

W. BEN. HUNT
Hales Corners, Wis.

(Continued from page 222 of the May, 1945, issue)

Indian Travois

The travois shown in Figure 177 is a real project for anyone who wishes to do a more than ordinary job of whittling. As shown, it has been left in the rough state, that is, the knife cuts have not been sanded off. If the cuts are rather uniform the effect is very

pleasing. White pine was used for the horse and squaw and for the tepee bundle on the travois. The travois and the three cross members are of willow, which by the way, had to be stained to match the pine. Willow wood is whiter than pine.

through the mouth of the pony for the rope, and the other end of the rope is then inserted into a hole so that it appears as though the squaw were holding the rope and her blanket at the same time.

To assemble the project, cut a piece of

The American Iron and Steel Institute recently published the statement that of the 214,000 steel workers who went to war, 10,100 have already returned.

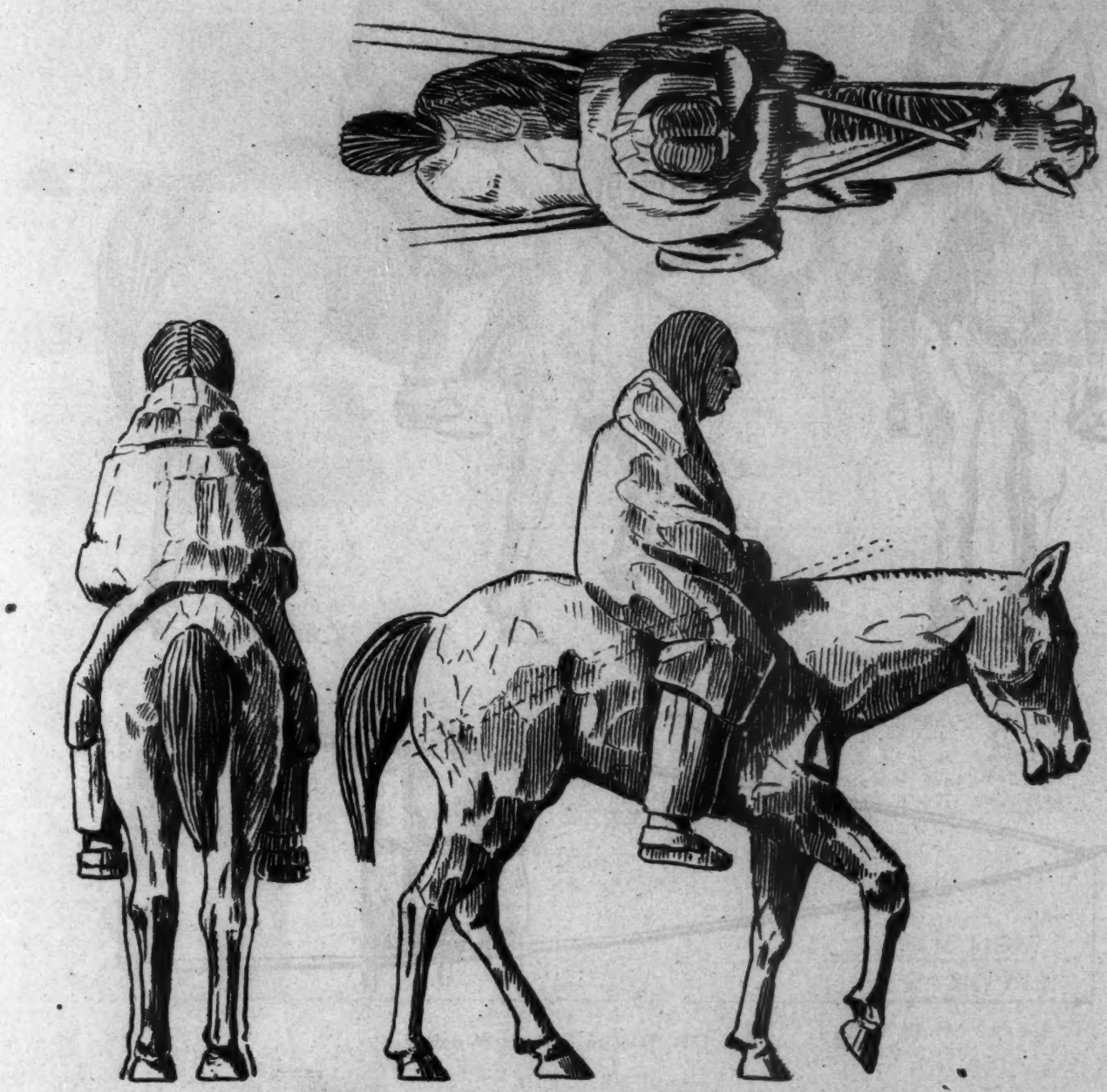


Fig. 179. Full-size patterns of right-hand side, rear, and top views

The Indian woman represents a Sioux with her blanket wrapped around her. Her leggings show below the edges of the blanket. You will probably wonder why the horse and Indian are not whittled separately. The two were whittled out of one piece because this is a lot simpler than trying to fit the squaw snuggly on the pony. Holes are drilled alongside the pony's sides, under the squaw's thighs for the travois, as shown in Figures 178 and 179. A small hole is also drilled

rough orange crate wood about 4 by 15 in. Glue or cement the pony in place first. Then attach the travois poles, which must be cemented and pegged to the base. Tie these in place to dry. While the poles are drying, you can fit the cross pieces on by cutting small notches on the undersides, and fastening them with a drop of cement. Let this dry and then tie the cross pieces to the sides. The bundle is then fitted to the cross pieces, set in place with a few dabs of cement, and lashed in place. If your friends are going to handle this whittled project a lot, protect it with a few coats of clear lacquer over everything but the base.

John Adams, James Madison, John Quincy Adams, Andrew Jackson, John Tyler, Millard Fillmore, Franklin Pierce, James A. Garfield, Grover Cleveland, William McKinley, William H. Taft, Woodrow Wilson, and Warren G. Harding all taught school sometime during their lifetime.

Education is the fertilizer of business. Business grows as education becomes effective and shrinks as education declines. —*Dr. R. L. Cooley.*

(Continued from page 270)

switch is mounted a name plate reading *filament voltage. Note:* The numbers used in parentheses preceding refer to the diagram shown.

e) The output socket (this is a standard five prong socket)

f) The meter jack

g) The input plug

h) The fuse receptacle for the vibrator circuit.

Figure 2 shows the same view as the one in Figure 1, except that the dust cover is removed. The filter choke is shown on the left and the power transformer on the right.

Figure 3 shows the rear view with the dust cover removed. Looking from left to right we see the power transformer, the vibrator, and the two type 6 by 5 tubes. The filter choke is behind the type 6 by 5 tubes.

Figure 4 presents the top view of the unit. It shows the location of the power transformer, the filter choke, the vibrator, and the two type 6 by 5 tubes.

Figure 5 shows a bottom view of the unit. The filter condenser is removed so as to show the wiring of the tube sockets and power transformer.

The chassis is laid out to suit the parts available and great care should be used that a professional looking piece of equipment will result. After the drilling is completed, all holes are carefully filed to remove burrs and any rough edges, or to complete the fit for the parts.

Mount all of the parts to the chassis with bolts where required using No. 10–32 machine screws for the transformer and choke, and No. 6–32 machine screws for the tube sockets and the input plug. After all of the parts are mounted, it is advisable to paint the chassis and the transformers with a suitable color of enamel to match the equipment with which the unit is to be used.

Before the student attempts a project of this type, the instructor should give sufficient drill, if needed, that the students can do a neat and workmanlike job of soldering.

It is recommended to wire the vibrator or six volt d.c. circuit first, using a number 10 B. and S. gauge automotive type wire. The 110 volt a.c. circuit and the six volt a.c. filament winding should be wired next using a No. 18 B. & S. gauge wire which should be of the push-back type. The filaments of the type 6 by 5 tubes should be wired in parallel with the same kind of wire. The high voltage a.c. and d.c. circuits should be wired with a good grade of hook-up wire capable of handling 1000 volts (No. 20 B. & S. gauge). The input cable assemblies are wired as shown in the diagram. The wire used for these assemblies is given in the bill of materials. If the d.c. cable has to be longer than 10 ft., it is recommended to increase the wire size to No. 6 B. & S. gauge up to 15 ft. and a No. 4 B. and S. gauge up to 25 ft. The reason for increasing the wire size is to prevent line voltage drop as the length of the cable increases. After all of the wiring is completed it is necessary to check the complete circuit to be sure that it is wired correctly as shown in the diagram.

After the student is satisfied that his work is correct it is necessary for the instructor to check the wiring also, and thus save time and correct any errors that may have crept in. An ohmmeter is very helpful in checking this work to make sure there are no shorts or cross connections.

When first putting the unit into operation it is advisable to start with 110 volt a.c. circuit to make sure that the input and output connections are properly wired. For the preliminary tests the author used a 25,000 ohm, fifty watt resistor as a d.c. load while making output voltage measurements. The readings obtained from our tests should agree with the manufacturer's specifications of the power transformer. The instructor should have definite preparation to assist the student in calibration of the power supply. It is suggested that reference be made to *"A Universal Power Supply,"* INDUSTRIAL ARTS AND VOCATIONAL EDUCATION for February, 1944, pages 65 to 68 where complete instructions are given as worked out by the author.

After the unit has been thoroughly checked on a.c. operation, the input cable is removed and the d.c. cable is plugged in and connected to a six volt storage battery that is fully charged. When the voltage check is completed on d.c. operation (the same as made for a.c. operation) a condenser (C_5) is placed across the a.c. primary winding of the power transformer. To determine the capacity of this condenser start with a 0.05 Mfd. 600 volt paper condenser. Increase or decrease the capacity of the condenser until a steady d.c. output voltage is obtained. This condenser is the same as the buffer normally used in vibrator power supplies.

Operating Instructions:

1. Insert the proper input cable for the supply voltage available.
2. Connect the load to the ouput terminals or socket.
3. Turn on the filament voltage switch (SW_1) allowing at least a half minute for the tubes to warm up.
4. Turn on the plate voltage switch thus applying the *B* voltage to the load. If a zero to 150 d.c. milliammeter is connected to the meter jack, the d.c. current drawn by the load is indicated. The bleeder current is not indicated by this reading.

Bill of Materials:

T_1 — Combination vibrator Power Transformer (Hadley P7557)
120 v.-a.c. } Primary
6 vibrator }
375 v.-d.c. at 125 m.a. output
6.3 v.-a.c. at 4.5 a.

Ch_1 — 36 T. No. 12 s. c. e. magnet wire layer wound on ½ in. form (3 layers)

Ch_2 — 15 henries at 150 m.a.-d.c. Resistance 200 ohms (Thordarson T-74C29)

C_1 — 0.5 mfd. paper condenser 400 v.-d.c.

C_2 — See article

C_3, C_4 — 8 mfd. paper condenser d.c. working voltage 600 v. (Cornell Dubilier TJU 6080)

Vibrator — Heavy duty 4 prong, nonsynchronous type (Mallory 825)

R_1 — 25,000 ohms 50 watt wire wound resistor (Ohmite 0418)

SW_1 — Heavy duty d p s t Toggle switch

SW_2 — D p s t Toggle switch

Meter jack — Closed circuit phone jack

PL_1 — Green jewel pilot light assembly

PL_2 — Red jewel pilot light assembly

Input Plug — 8 prong heavy duty chassis type plug (Jones 400 series)

Input Cable — *A.C.* —
Assemblies
1 — 8 prong socket (Jones 400 series)
10 ft. — 2 conductor cable
1 — Line plug heavy duty type (Amphenol 61 M 4)

D.C. —
1 — 8 prong socket (Jones 400 series)
10 ft. — 2 conductor No. 8 cable
2 — Battery clips
Note: Sockets are heavy duty type and are to fit the input plug

Miscellaneous:
Chassis, dust cover, and bottom plate
Hardware: Bolts, nuts, solder wire, 8 spaghetti

EXPERIMENT

To the Instructor: This experiment is included for use with students who are not familiar with the operation of *Vibrator Power Supplies*. The parts used in the experiment are not the same as those required for the *Combination Power Supply* by the author.

Job: Construct a simple vibrator power supply.

Object: To observe its operation, and determine its voltage regulation and maximum power output.

General Information: It is often necessary to obtain a high source of d.c. voltage sufficient in value to operate a low power transmitter, or a small radio receiver, from a low d.c. source — usually a storage battery. It is the intention of this job to construct just such a vibrator supply from available parts on hand with primary emphasis on principle of its operation, and not so much on its available power or its efficiency.

Procedure:

1. Connect 6 volt storage battery in series with switch, wire wound core or interceptor magnet T_1 contact points and primary of power transformer.
2. Connect the secondary to plates of rectifier tube with center tap grounded.
3. Connect filament of tube across 6 volt battery.
4. Connect wire from cathode to choke T_2 and then across resistor R to ground.
5. Connect buffer condenser C_1 from each plate to ground.
6. Connect filter condensers C_2 from input and output ends of choke, also to ground.
7. Connect condenser *C* across contact points.
8. As the switch is closed the filament is heated and the interrupter T_1 is energized as well as the primary of T_2. This causes the armature to be drawn to the core of T_1 thereby opening the contacts, and the flux in the T_2 to collapse and a high voltage to be induced into the secondary; which, of course, is rectified and filtered by the tube and filter

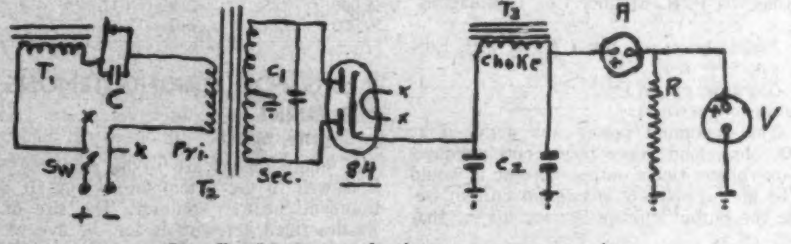


Fig. 7. Diagram of vibrator power supply

network. The armature in breaking the circuit is not free to spring back and remake contact, thus repeating the cycle.

9. Plot the voltage against the current taken from the meter readings at various values of R.

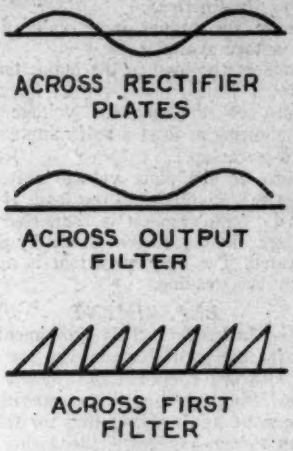


Fig. 8. Oscilloscope patterns

10. Plot the power output against the current taken for the various readings. See Figures 9 and 10.

Questions:

1. Determine the load resistance of which maximum power output is obtained. Why is this not at the point of maximum current?

2. Why must we use a condenser across the points?

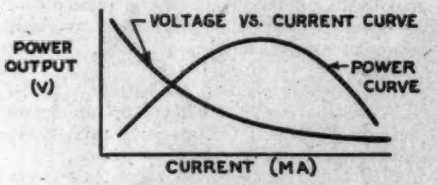


Fig. 9. Power plotted against current

3. Why is it important to have very low resistant contacts as well as clean contacts for the points?

4. What would you expect the buffer condensers to do in this circuit?

5. What kind of current are we dealing with after it passes the breaker points?

6. At what frequency should the breaker vibrate for best results with the transformer you used in the construction?

References:

1. *M Y E Technical Manual*, pp. 64 to 92, published by P. R. Mallory Co., Indianapolis, Ind.

2. *Radio Amateurs' Hand Book*, 19th Edition, pp. 154, 336, 338.

3. *Ghirardi*, pp. 973–979.

Answers to Questions:

1. The maximum power was obtained at 15,000 ohms load. Since power output equals output voltage times output current it would not be at the point of maximum current because the output voltage is very low at that point.

2. A condenser is used across the points to cut down the arcing. As the points open the condenser charges absorbing the energy that would otherwise cause arcing.

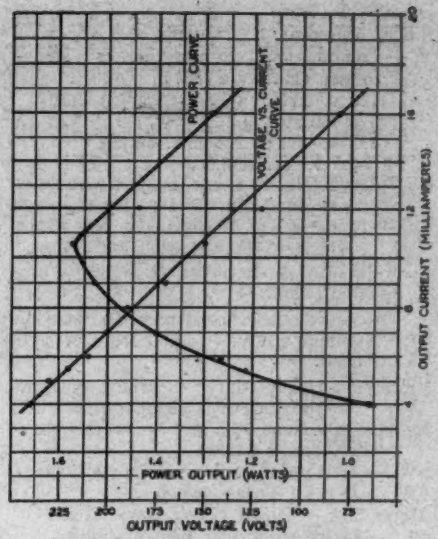


Fig. 10. Voltage-current-power curve

3. Low contact resistance is important in vibrators because less energy is wasted in the points and more energy can be transferred to the transformer coil itself. If the points are dirty they will heat thus burning and arcing; this will eventually destroy the points of contact.

4. The buffer condenser is placed across each half of the secondary to absorb any high frequency voltage and bypass it to ground. This high frequency voltage is caused by the vibrator. If it is not bypassed to ground it will damage the filter condensers and also make the output voltage unusable for receivers.

5. We are dealing with alternating current after the voltage passes the vibrator points, since the vibrator breaks and makes at a rate of about 75 times per second.

6. For the transformer we used, the vibrator should produce a frequency above fifty cycles and not exceed 120 cycles.

Data:

R (load) ohms	*I (output) M.A.*	*E (output) volts*	*P = E x I watts*	
5,000	16	80	1.28	
10,000	12	120	1.44	
15,000	10.5	150	1.575	= Maximum
20,000	9	170	1.53	power
25,000	8	190	1.52	output
30,000	7	200	1.4	
35,000	6	210	1.26	
40,000	5.5	220	1.21	
45,000	5	230	1.15	
50,000	4	240	.96	

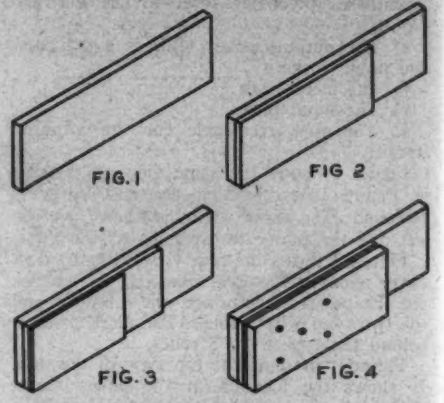
JIG FOR MAKING TENONS

P. S. BURNS
Seattle, Wash.

If many tenons are to be made by hand it is well to use a template or jig. It saves time and insures accuracy. The size of the jig described herewith is for the average variety of work in the shop. For special work it can be made to suit the occasion.

First, take the flat surfaced piece ¾ by 6 by 20 in., shown in Figure 1. To this fasten a piece which is to be the thickness of the tenon desired. In ¾-in. material it is well to make the tenon ⅜ in. thick. Therefore, the piece to be fastened to the first should be ⅜ by 6 by 14 in. Place it as shown in Figure 2.

Next place upon the two already assembled a thin piece of wood which is just a trifle thicker than the thickness of the saw to be

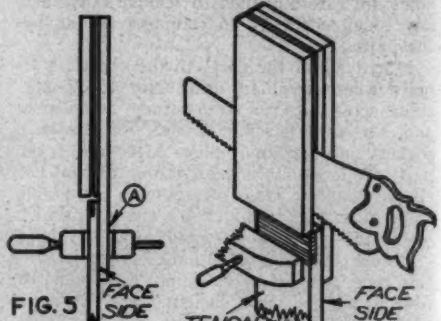


used. This piece should be about 1/16 by 6 by 10 in. See Figure 3.

Lastly, place a piece of ¾ by 6 by 14 in. on top of the other three and fasten them all together with 5 No. 10 by 1¼-in. screws as shown in Figure 4. This completes the jig.

How to Use Jig

To use the jig, clamp the piece to be tenoned firmly to the jig, as shown in Figure



5. The clamping may be done in the vise or with hand clamps. The waste material of the tenon should be on the outside. Therefore, place the face side of tenon piece against guide piece A, as shown in Figure 5, place the saw in slot, and cut to the desired depth as shown in Figure 6.

ARC WELDED STOOLS

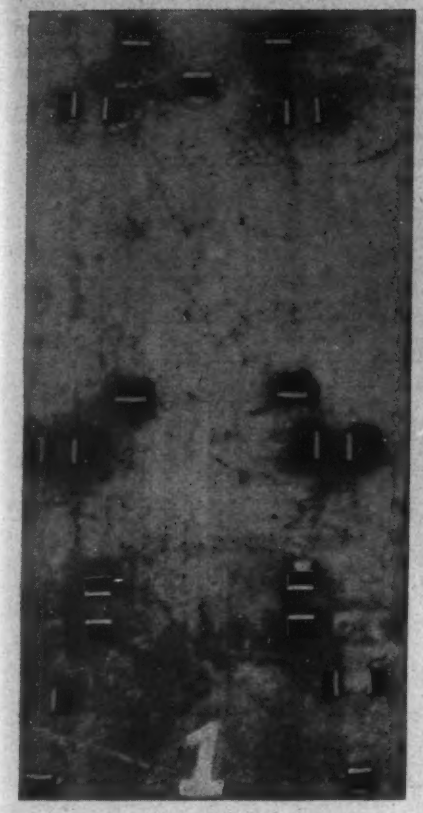
LEWIS W. DONALDSON
Samuel Gompers Vocational High School
New York City

During the past term, the students in the welding shop at the Samuel Gompers Vocational High School, Bronx, N. Y., fabricated and welded stools of different sizes, which are now being used in the drawing and science rooms of the school.

This project proved to be worth while economically, and the educational value to the student was high, because it involved not only the fundamental processes of arc manipulation in the flat position, but also included the welding of angle iron members that were not readily accessible.

Other operations introduced to the beginner in welding were the setting up tack welding of the angle iron legs in the welding jigs. These operations are of major importance to one who is to continue welding in the industrial world.

As we all know, modern production demands modern production facilities. There-

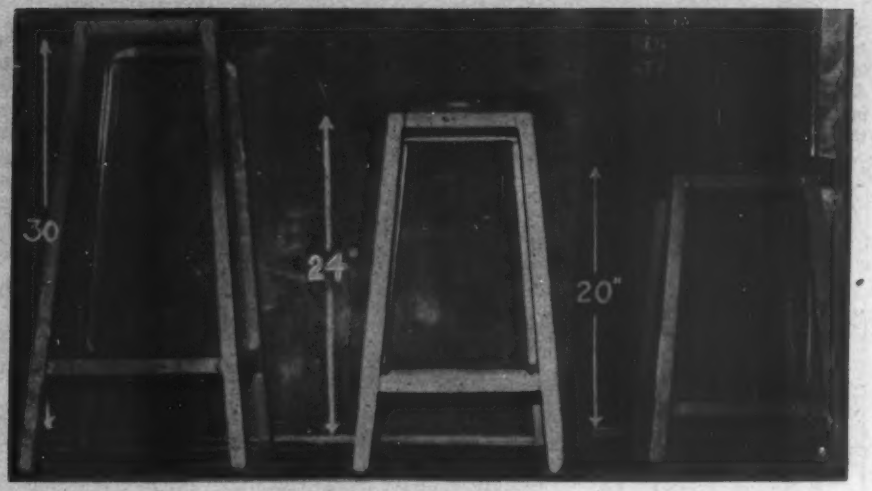


Jig for welding the sides

fore, to expedite the assembly of these stools, and to insure that each part was properly aligned, jigs were introduced. These jigs were inexpensive, and the time element involved in their construction was certainly compensated for by the speed of construction and the accuracy of the finished product.

Three sizes of stools were made and the jigs were so constructed that one jig was capable of handling the three sizes of stools.

Jig for assembling the welded sides



Arc welded stools

This condition was made possible by having a removable bottom-stop bracket for the medium and short stool assemblies.

Development of the Project

The operations involved in the making of the stools were as follows:

1. The cutting of 1 by 1 by ⅛-in. angle iron to size. The drilling of 3/16-in. holes in the 1 by 1 by ⅛-in. angle to which the wooden seat is to be attached. These operations are performed in the machine shop.
2. The tack welding of two sides in jig No. 1.
3. Placing the two tack welded sides in jig No. 2 on edge and tack welding them together with two cross members.
4. Removal from jig No. 2 and placing the three-sided assembly back in jig No. 2 upside down and tack welding the other two cross members.
5. Removal from jig No. 2 and welding steel cups or gliders at the bottom of each leg to prevent the sharp ends of the angle iron legs from marring a wooden floor.
6. Painting the angle iron assembly.
7. Numbering all seat tops to correspond to the room number where the stools are to be used. This was a branding operation and was performed in the heat treatment of the metals shop.
8. Placing the wood seat on the frame and fastening it in place with wood screws.

Evaluation of the Project

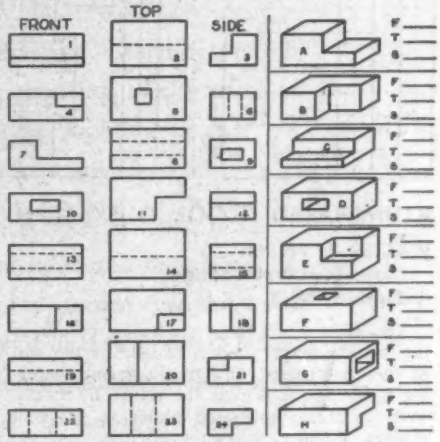
Tests made on sample frames before the wooden seats were attached revealed that the frames could support a vertical compression load of 16,000 pounds without any sign of buckling. Similar tests made with the stool lying on its side revealed the same results showing that the welded joints were strong. The wooden seat is sufficiently strong to support any normal load that might be applied. Having the stool welded instead of bolted eliminates the possibility of any moving parts that might get loose and hence does away with squeaks and other undesirable noises and at the same time insures maximum safety.

ORTHOGRAPHIC PROJECTION

HARRY F. MERGLER
West Technical High School
Cleveland, Ohio

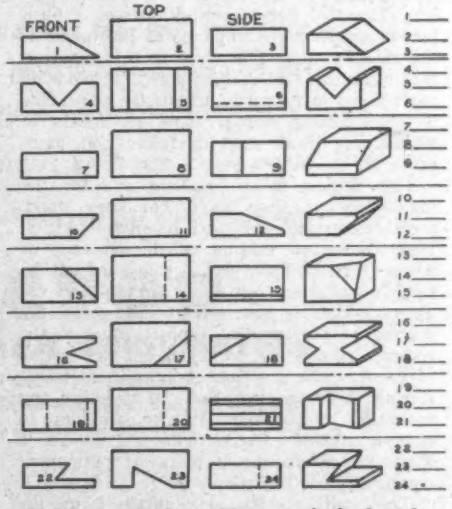
Part I — Recognition of Views

Directions: For each perspective select the correct front, top, and side views, and write the view numbers in the appropriate space after each perspective.



Part II — Revolving Views with Oblique Lines

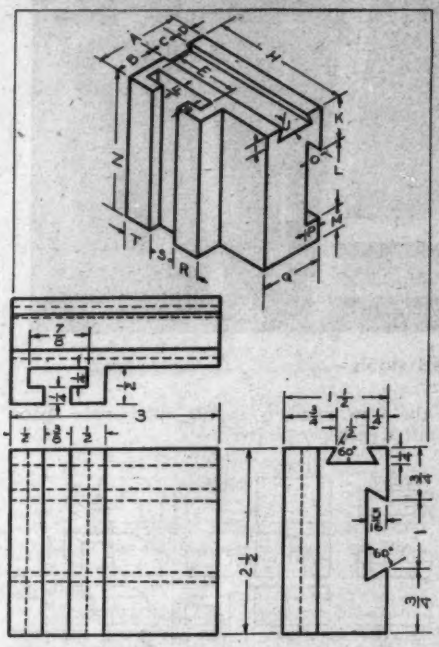
Directions: Some of the front, top, and side views are true and some are false drawings



of the perspectives. Place a (+) for the true and an (O) for the false in the proper spaces at the right.

Part III — Reading Test

Directions: Select from the working drawing the dimension corresponding to the one designated by the letter on the picture drawing. Place the dimension on the line after the letter in the answer column.



ILLUMINATED "TOOL OUT" SIGN

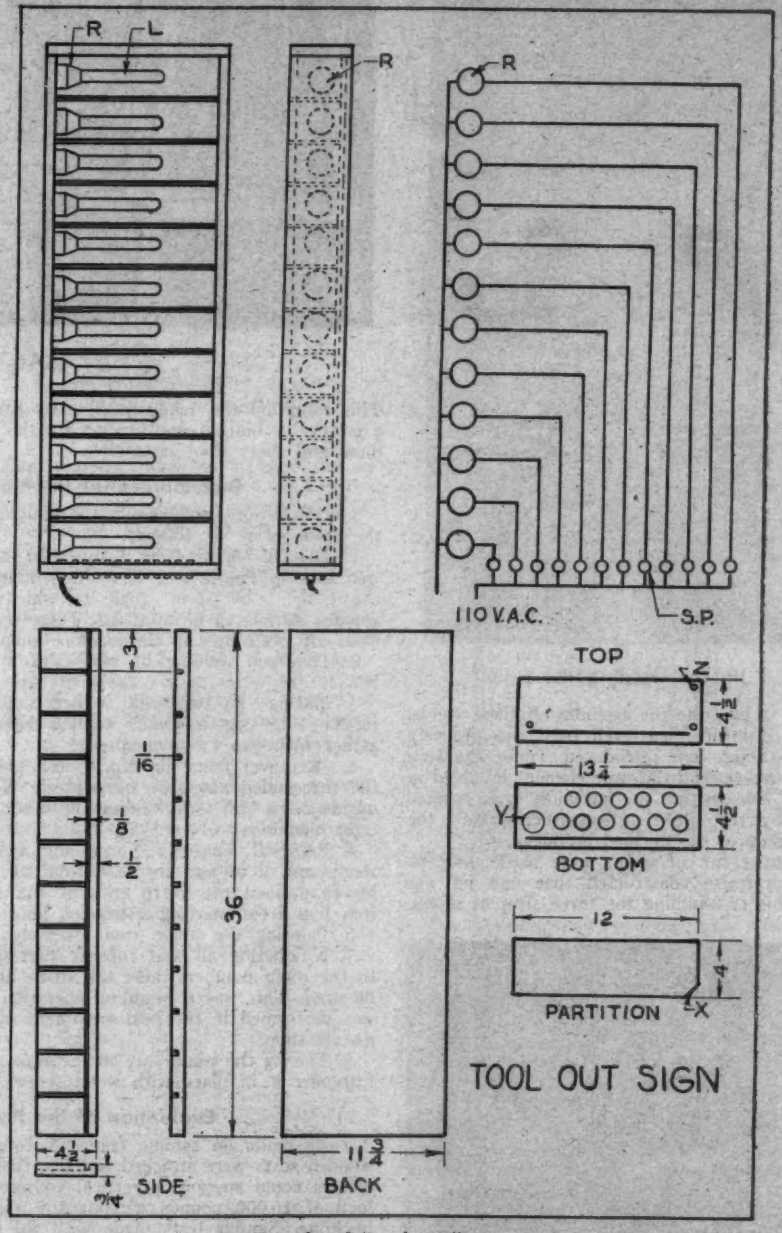
WALTER B. WEBER
State Teachers College
Buffalo, N. Y.

The time when most confusion occurs in the industrial-arts shop is usually at the end of the class period. One of the factors entering into this problem is the return of special tools to their designated places in the tool cabinet. In many cases the instructor, or the tool keeper designated by the shop management plan, must raise his voice to announce that certain tools are missing.

The photo shows an electrically illuminated tool out sign which will help solve this problem. The tool keeper simply presses a push button switch which illuminates the name of the missing tool. The class is so instructed that while this sign is illuminated, all students must assist in locating the missing tool. This idea of getting special tools in, assists in maintaining good shop discipline and management.

This project is an excellent one for the industrials-arts shop as it combines wood, metal, electrical work, and drawing activities. It provides problems in calculation sizes of wires, current flow, watts consumed, B. X. cable installation, controlled circuits and the use of miniature push switches. In wood, the making of a permanent cabinet equal to the commercial product, the laying out and cutting of grooves, the drafting of letters and transferring them to glass and the finishing and mounting of the sign. It also provides an opportunity for group activity and the added incentive of making a piece of permanent equipment for the shop.

The switches are self-contained in the cabinet and a small sign below designates its respective tool. Another design would be to make the sign five inches wider to accommodate the switches on the face of the sign. This would eliminate the use of the small sign underneath. The method of construction shown however has educational value in that the student must make a mental picture of the particular switch location and transfer this impression into action by pressing the proper button.



Details of "tool out" sign

Bill of Material

Electrical Material:
- 12 Standard porcelain cleat receptacles
- 12 110V.–25 watt tubular lamps
- 12 110V.– 5A midget push switches
- 1 B.X. end and cable to reach to the nearest outlet
- 25 ft. of No. 16 fixture wire
- 5 ft. of No. 14 S.B.R.C. wire

Wood:
- Back — ¼ by 11¾ by 36 in.
- Sides — ¾ by 4½ by 36 in.
- Top and bottom — ¾ by 4½ by 13¼ in.
- Partitions — 12 by 4 by ⅜ in.

Glass:
- 12 by 18 in.

Construction

The back of the sign is set in so that the signs looks neat from the sides. There are no special operations on this piece.

The sides are grooved for the glass and partitions. Care should be exercised not to have the partition grooves extend beyond the grooves for the glass. They can, however, extend all the way to the back.

The bottom is indicated as being ¾ in. thick. If the shanks of the switches do not reach through this thickness, the inside should be counterbored to accommodate the rear portion of the switch. The back must be counterbored for the lock nut on the B. X. end.

When all the parts are finished the sign should be temporarily assembled to see that the parts fit. Make sure that the glass slides in the grooves freely. Dismantle the sign and stain, fill and finish the parts. This procedure will facilitate the mounting and wiring of the

(Continued on page 18A)

Sold!

BUT NOT FORGOTTEN

service maintained on thousands now in use . . .

THANKS to Victor's World Wide Service, new chapters of "Maintenance" are being written . . . keeping pre-war and war time projectors at the gruelling, vital war job of training and entertaining on the Fighting Fronts. At home, too, Projectors must be kept running.

The various branches of the Service, Schools, Industry and Churches have learned the value and importance of this outstanding service . . . have learned that the word "Sold" does not carry a finality of interest in the dynamic job that Victor Projectors are doing throughout the world.

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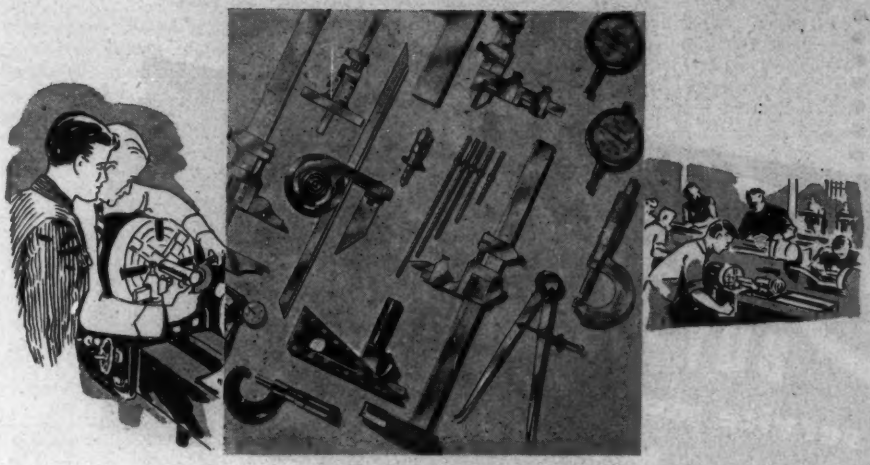
MAKERS OF 16MM EQUIPMENT SINCE 1923



WHETHER THEY'RE "Learning" or "Earning"
They Prefer STARRETT TOOLS

In the classroom or in the war production plant, the lasting accuracy, dependability, "heft" and "feel" of STARRETT TOOLS makes them prime favorites. Students started with STARRETTS, appreciate their fine quality and craftsmanship, quickly learn to use them with the same confidence and pride that has made them first choice of skilled machinists for more than seventy-five years.

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THE L. S. STARRETT CO., ATHOL, MASSACHUSETTS, U.S.A.
World's Greatest Toolmakers

STARRETT TOOLS
Precision Tools...Dial Indicators...Ground Flat Stock...Hacksaws...Metal Cutting Band Saws...Steel Tapes

with the class the proper layout of the letters to accomplish this purpose. When the paint is dry slide the glass into the frame and screw the top on the sign. NOTE: Depending upon the method of mounting the sign, it may be necessary to fasten the sign to the wall before inserting the glass and fastening the top.

Fasten the B. X. cable and connect the ends to the power supply. Test each circuit for proper control.

The illuminated sign

Make a small 3 by 8-in. wood sign, and bevel the edges. Cut a piece of white drawing paper to fit this space and lay out small circles to represent the position of the switches. Letter each circle to correspond to its respective switch. Shellac or cover the drawing with a sheet of celluloid. Mount this sign directly beneath the tool sign.

Then call the members of the class together and explain the use and operation of the sign. Have each student light the lamp beneath the name of the tool you designate. This will satisfy the student's curiosity, eliminate the possibility of the students fooling with the sign, and at the same time instruct them in its use.

"TOOL OUT" SIGN

(Continued from page 276)

electrical parts. On the inside of one of the sides, fasten the receptacles in their proper location, as shown in the illustration. Connect one side of all the receptacles together with a piece of No. 14 S.B.R.C. wire leaving sufficient slack to pass through the corner openings in the shelves. Connect a No. 16 fixture wire to the other side of each receptacle and leave each long enough to reach to its respective switch.

Mount all switches and the B. X. end on the bottom. Connect one side of all switches together with a piece of No. 14 S.B.R.C. wire. Connect the ends of the No. 16 wires to their proper switches. Leave just a sufficient amount of slack to facilitate the work.

Assemble the sign, glue the back and partitions in place and screw on the bottom. Secure the proper length of B. X. cable, remove the armor and prepare the wires for connections. Fasten the B. X. cable into the B. X. end and splice these two wires to the two No. 14 wires within the sign. Solder and tape the connections with rubber and friction tape. NOTE: Another method of securing power would be to install a convenient outlet in the bottom of the sign and use a flexible cord. Place a tubular lamp in each receptacle and test each circuit.

Select the names of twelve special tools and lay them out on paper according to the dimensions given in the drawing. Place the glass over the drawing and paint the glass black, leaving the letters clear. *Important:* The paint should be on the inside of the glass. Discuss

Personal News

PIONEER ILLINOIS SHOP TEACHER DIES

Arthur C. Bloodgood, retired shop teacher at Aurora, Ill., passed away after a short illness at the Aurora Copley Hospital, on April 12, 1945.

Mr. Bloodgood retired from his teaching and executive position in 1938. He began his teaching career in Aurora's East High School 44 years ago as instructor of manual training, and later was appointed to the dual position of director of industrial work and superintendent of buildings and grounds for the Illinois school district No. 131.

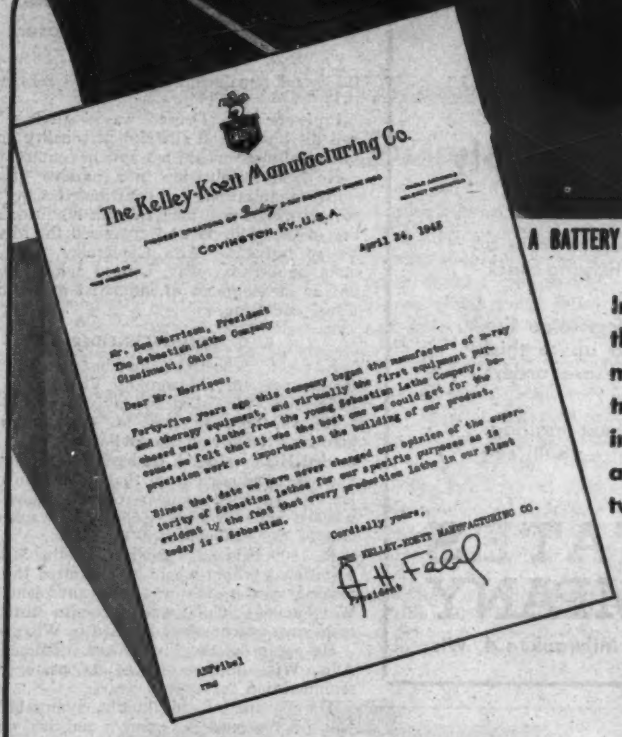
He was born in Van Etten, N. Y., in 1868. Throughout his entire lifetime he has been more or less associated with woodwork interests. His father was a mill operator in the East, where

(Continued on page 20A)

WHERE PRECISION IS VITAL PRECISION EQUIPMENT IS ESSENTIAL!

That's why only Sebastian Lathes are used in the production of KELEKET X-RAY

A BATTERY OF SEBASTIAN LATHES IN THE KELLEY-KOETT PLANT NO. 1



The Kelley-Koett Manufacturing Co.

COVINGTON, KY., U.S.A.

April 24, 1945

Mr. Dan Harrison, President
The Sebastian Lathe Company
Cincinnati, Ohio

Dear Mr. Harrison:

Forty-five years ago this company began the manufacture of x-ray and therapy equipment, and virtually the first equipment purchased was a lathe from the young Sebastian Lathe Company, because we felt that it was the best one we could get for the precision work so important in the building of our product.

Since that date we have never changed our opinion of the superiority of Sebastian lathes for our specific purposes as is evident by the fact that every production lathe in our plant today is a Sebastian.

Cordially yours,

THE KELLEY-KOETT MANUFACTURING CO.

A. H. Field
President

AHFvibel
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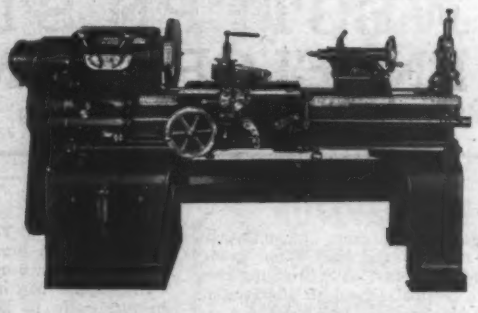
Internationally famous peacetime leaders in the manufacture of x-ray and therapy equipment for the medical profession and the industrial users, Keleket is virtually 100% engaged in producing vital precision equipment for the armed forces under the proud banner of a twice won Army-Navy "E" Award.



A lathe with a reputation such as this, is a good lathe to learn on as well as to work on. Sebastian Lathes too, are built by men who have shared in winning the coveted Army-Navy E Award!

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No. 4 Planning for the Future Series

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The color of the envelope used to bring back responses from a mailing is often the difference between a huge, satisfying stack of returns and a disappointing trickle.

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(Continued from page 18A)

he became interested in lumbering and millwork. Mr. Bloodgood attended the Van Etten grade school and Spencer Academy. After studying two years in the State Normal School at Whitewater, Wis., he received his teacher's diploma.

His teaching career of handwork consisted of one year at Merton, Wis., four years at the Wisconsin State School for the deaf and dumb at Delavan, Wis., one year at Waukegan, Ill., and 37 years in East High School at Aurora, Ill. In the year spent at Waukegan, Mr. Bloodgood organized the first manual training classes of that city.

Mr. Bloodgood was the *first member* of the old original Manual Arts Association of Illinois, and was associated with such prominent Illinois pioneers of industrial education as Allen, Bawden, and others. The present Illinois Industrial Education Association and the Illinois Vocational Association are outgrowths of this first organization. The first meeting of this manual arts group was held in Peoria. These early enthusiasts met, decided to organize in a professional association, pay dues, and be a live state organization. Because Mr. Bloodgood had to leave the meeting early to catch a train *back north* to Aurora, he paid the first dues and thus headed the membership list of the first state body of shop teachers in Illinois.

Mr. Bloodgood's death deeply moved citizens of Aurora in nearly every walk of life. His personality was a rare combination of kindness, fairness, willingness to serve, and love. Thousands of citizens were bonded to him in personal friendship, which, in itself, is the highest reward of any teacher. His heart felt the joys and distresses of everyone, and his charity knew no bounds or limitations.

He is survived by a widow, two sons, and a daughter. — *R. W. Burgett.*

C. S. VAN DEUSEN DIES

Prof. Clinton S. Van Deusen, 73, who held the position of head of the industrial-arts department at Kent State University from 1913 to 1942, died recently after a year's illness.

He was born in Newark, N. Y., October 1, 1871, and attended the public schools of that city, and then entered Cornell University from which he received the M.E. degree in 1893. He held teaching positions in Heuka Park, N. Y., Minneapolis, Minn., and Frankfort, Ky. In 1898 he became assistant professor of industrial arts at Bradley Polytechnic Institute in Peoria, Ill. He joined the faculty of Kent State University the second semester after its founding in September,

Prof. Clinton S. Van Deusen

1913, and remained there until his retirement in 1942.

Professor Van Deusen was a tireless worker and his kindly and cheerful personality endeared him to all with whom he came in contact.

He held membership in a number of professional organizations and contributed many articles to the professional magazines in his field. He was one of the pioneers who organized the Mississippi Valley Industrial Arts Conference, and, in his quiet unobtrusive way, exerted a great influence on the development of industrial arts and vocational education.

E. C. SCHATTSCHNEIDER DIES

Edwin C. Schattschneider, instructor of watchmaking at the Milwaukee Vocational School, Milwaukee, Wis., died Sunday, April 1, 1945.

He was born January 14, 1890, and received his early education at DeForest, Wis. He attended Highland Park College, Des Moines, Iowa, and was graduated from that institution in 1910. He also attended summer school sessions at Milwaukee State Teachers College, Milwaukee, Wis., and at the University of Wisconsin.

In 1909 he joined the staff of the Milwaukee Vocational School where he organized the watchmaking course. He was past president of the Watchmakers' Guild and was also instrumental in having watchmakers licensed in Wisconsin.

He organized the First Ward Mission in West Allis, Wis., and served as its pastor without remuneration for twenty years.

The passing of this kindly, sympathetic man will be mourned by many, and his numerous unselfish deeds will keep his memory fresh in the hearts of all with whom he had dealings.

APPOINTED COMMISSIONER OF INDIAN AFFAIRS

William A. Brophy, present chief of the Puerto Rican section of the Division of Territories and Island Possessions, has been appointed Commissioner of Indian Affairs to take the place of John Collier who has resigned.

Mr. Brophy was born in New York City in 1903. He attended St. Francis School in that city. In 1927 he entered the University of New Mexico, and later was graduated from the University of Colorado.

His first connection with the Department of the Interior was in 1934 when he was retained as a special counsel to handle legal matters relating to the Southwestern Indian tribes. In 1942 he was appointed special representative of the Secretary on Puerto Rican affairs. The following year he was appointed chief of the Puerto Rican section.

♦ Dr. William T. Bawden was awarded honorary membership in the Eugene Field Society, national association of authors and journalists,

(Continued on page 22A)

Make your SHOP WORK COURSES even more EFFECTIVE!

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★ *Stimulate Thinking*

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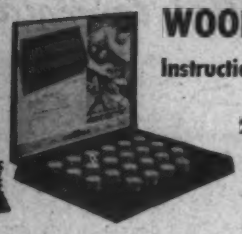

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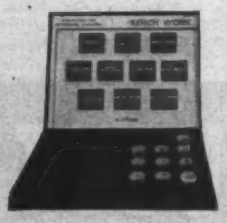

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Filing Hints To Meet Your Needs

Right Way to Hold a File

Fig. 1. Right way to hold a file with both hands.

Hold the handle of the file with the right* hand, and the tip of the file with the left hand. Although the position of the left hand varies with the job to be done, the right-hand grip remains the same. See Fig. 1. The beginner should let the file handle rest in the palm of the right hand, with the thumb lying along the top of the handle and the fingers curling around the handle and falling into a natural grip.

Fig. 2. Correct grip for removing stock rapidly.

When the tip of the file is gripped with the left hand, as shown in Fig. 2, with the ball of the thumb pressing upon the top of the file and lying in line with the file axis, and with the fingers winding around the file, a powerful grip is secured. When a lighter stroke is wanted, the direction of the left thumb is changed more and more until it lies at right angles, or nearly so, with the length of the file. The tip of the file is then held between just the thumb and the first two fingers of the left hand.

Fig. 3. Correct grip for flat filing.

Fig. 3 shows the correct method of holding the file for flat filing. Fig. 4 shows the correct method of holding the file for very accurate work, or when curved surfaces are to be filed. The grip shown allows maximum guidance and control.

Fig. 4. Correct grip for precision work.

Awarded to the Newcomerstown, Ohio, Plant

HELLER BROTHERS COMPANY
America's Oldest File Manufacturers
Good Tools Since 1836
Newark, N. J., Newcomerstown, Ohio

*The directions given are for a right-handed person. By reversing the file positions, they will apply as well for a left-handed person.

HELLER **NUCUT** FILES
WAVY TEETH

(Continued from page 20A)

in recognition of his many literary contributions in the fields of industrial arts and vocational education.

♦ DEVO B. FOX, director, Department of Guidance, and Vocational and Adult Education, Jackson, Mich., will assume the duties of director of vocational education and head of the industrial-arts education department of Western Michigan College of Education, Kalamazoo, Mich. He received the Ph.D. degree at the University of Pittsburgh, last August.

♦ HARRY GUNDERSON, formerly instructor of industrial arts in the junior high schools, Richmond, Ind., is now taking graduate work at Indiana University in preparation for the doctor's degree with a major in vocational education.

♦ GEORGE V. PRICE, recently of the U. S. Navy, is now teaching industrial arts in the West Lafayette High School. He is one of the first veterans in Indiana to return to shop teaching.

♦ JOSE A. VASQUEZ, vocational director of Caquas, Puerto Rico, is now attending Purdue University. He is a graduate of the University of Puerto Rico in Civil Engineering.

♦ Three of the drafting teachers of the Indianapolis Arsenal Technical Schools, Indianapolis, Ind., have gone into the services. They are: LT. COL. WARREN E. CLEVELAND, COMMANDER KENNETH U. COFFIN, and EMORY W. BRYAN.

♦ EUGENE E. BUTTERBAUGH of Ellettsville, Ind., has been assisting in the industrial-arts department at the University School, Bloomington, Ind., and serving as an instructor in engineering drawing in the A.S.T.R. Program at Indiana University.

♦ H. L. RECTOR, vocational director of the Peru Public Schools, Peru, Ind., has recently been appointed as the re-employment committeeman of Miami County, Ind. Mr. Rector has the responsibility of aiding returning servicemen with their re-employment and placement problems.

♦ ROSCOE PIERSON, who has been teaching industrial arts and physical education at Arsenal Technical Schools, Indianapolis, Ind., has been transferred to the industrial-arts department of the Thomas Carr Howe High School.

♦ WILLIAM CHRISTENSEN, a former teacher of drafting at Howe High School, Indianapolis, Ind., is supervisor of training at the Curtiss-Wright war plant. Mr. Christensen was one of the speakers on the Industrial Education Conference held in Terre Haute last month.

♦ WAYNE SHRUM, who taught drafting and metal shop at Howe High School, Indianapolis, Ind., is now supervisor of inspectors at Curtiss-Wright.

♦ BERTRAM SANDERS, for 33 years a member of the staff of the Emmerich Manual Training High School, Indianapolis, Ind., died on April 16 of a heart attack.

♦ L. E. FALGREN, Kansas City, Kans., and E. J. LOGSDON, Lawrence, Kans., discussed the unit day trade courses offered in their respective cities, at station KKKU on April 26 at 9:30 p.m.

J. C. WOODIN of Wichita, Kans., and J. W. JARROTT of Hutchinson, Kans., discussed war-production training and evening school programs, at the same station on May 3.

♦ ESMOND SHAW, professor of architecture and assistant to the dean of the Cooper Union Art School, Cooper Square, New York 3, N. Y., has been appointed acting head of the school, succeeding Dean Guy Gayler who died on April 17.

♦ GEORGE H. FERN, former director, Michigan State Board for Vocational Education, has been appointed chief of the training branch of the office of the Secretary of War, Washington, D. C. He will be in charge of civilian training for 1,200,000 war department civilian employees.

News Notes

♦ Classes to train veterans of World War II as civilian technicians for work at army air installations throughout the 13-state area of the Second Air Force was to get under way April 16 in Topeka, Kans. The Second Air Force has asked the Topeka Board of Education and the State Board for Vocational Education to set up a training program to fill jobs as welders, sheet-metal workers, radio technicians, and automotive mechanics. Classes are to be conducted in the Topeka Trade School.

Any veteran who does not have a handicap which would make it hazardous for him to undertake the training may qualify for training. All veterans who are interested in taking the training may make application immediately through the United States Employment Office. Classes will last eight hours a day and training sessions will be from eight to ten weeks in length.

♦ The refresher course in textiles and testing techniques held yearly in the main laboratories of the United States Testing Co. Inc., Hoboken, N. J., will be repeated this summer. These sessions are planned to bring up to date and expand theoretical textile studies.

Classes will be in session from 9:00 a.m. to 4:00 p.m., beginning July 9 and extending through July 27. A small fee is charged to cover the cost of supplies, mimeographed text, and samples necessary for the student's laboratory work. The group is limited in number so they may have the advantage of individual instruction and the opportunity to work with testing equipment. Applicants are required to have some elementary textile training in order that a major portion of the three weeks may be devoted to intensified study.

Applications available from the United States Testing Company's main laboratory in Hoboken, N. J., will be sent on request.

♦ The first issue of Westinghouse *Newsfront*, a new monthly publication by the Westinghouse

(Continued on next page)

(Continued from previous page)

Electric and Manufacturing Company, will appear in April.

The four-page report, printed in two colors and illustrated with drawings and photographs, will contain short articles describing the latest achievements by this firm in the fields of scientific research, engineering, and production. Featured in the first issue are a story on a new application of the Precipitron air cleaner for the removal of fly ash, and a picture page illustrating recent Westinghouse developments.

Requests to be placed on the mailing list should be addressed to the Editor, Westinghouse *Newsfront*, 306 Fourth Avenue, Box 1017, Pittsburgh, Pa.

♦ According to a decision made by the Surplus Property Board, surplus government-owned cutting tools shall be disposed of through the original manufacturer.

♦ Nearly 700 motion pictures and film strips produced by the U. S. Government for training and educational purposes are now available for purchase by schools, industry, and other civilian groups.

All of these visual aids to education are described in a new catalog which gives synopses, running time, subject groupings, and prices of the various films and film strips.

Copies of the new catalog, just off the press, may be obtained on request from the Division of Visual Aids, U. S. Office of Education, Washington 25, D. C., or from Castle Films, Inc., 30 Rockefeller Plaza, New York 20, N. Y.

♦ Sunday, April 15, marks the eightieth anniversary of the tragic death of Abraham Lincoln in the closing days of the Civil War.

On this dark day of April 15, 1865, one of the oldest patriotic organizations of the country was founded when three army officers met in Philadelphia to make preparations for Lincoln's funeral and formed the Military Order of the Loyal Legion of the United States.

Marking this day, the Loyal Legion announces the opening of a nationwide patriotic award of $500 for the best essay in less than 500 words on the subject, "What My Country Means to Me."

In this effort to start the young people thinking and writing their best ideas of what our country really means to them, the contest is open to anyone under the age of 21 on October 1, 1945. Manuscripts may be submitted to the Recorder of any of the 19 Commanderies of the Order from coast to coast, or details may be obtained by writing to The Loyal Legion Foundation at the World War Memorial at Indianapolis, Ind.

The contest will close on September 15 and the award will be made at the annual meeting of the Loyal Legion in Boston late in October.

♦ A 12-page brochure, covering the object and purpose of the Award Program for Textbooks in Modern Design, and setting forth all rules and conditions governing the program, has just been published by trustees of The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

Requests should be addressed to Secretary, The James F. Lincoln Arc Welding Foundation, Cleveland 1, Ohio.

♦ The proposed revision of Simplified Practice Recommendation R192-42, Crayons, Chalks, and Modeling Clays for School Use (Types, Sizes, and Packaging), has been accorded the required degree of acceptance by individual manufacturers, distributors and users to warrant promulgation, according to an announcement by the Division of Simplified Practice, National Bureau of Standards. The revised recommendation will be identified as R192-45, and will be effective from May 1, 1945.

Mimeographed copies of R192-45 may be obtained upon request from the Division of Simplified Practice, National Bureau of Standards, Washington 25, D. C.

♦ Research data, much of which is buried in the many departments of the technical schools and universities, are now being made available to industry in carefully indexed form.

Through the co-operation of the leading technical schools and universities, the theses that are of importance to industry and research, will be indexed in the technical "Digest-Index" issued by The National Research Bureau, Inc., 415 North Dearborn St., Chicago 10, Ill.

If it's a small part

. . . turn it with Precision, Speed and Profit on a

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Model S-56
10" Precision Lathe

Engineered for precision shop and tool room work. Rigidly built to stand up and hold its close accuracy under round-the-clock operation. This is a quality machine tool in every detail, yet is moderate in price . . . a lathe that stands out far ahead of others. The lathe selected by U. S. Army, the Navy and the Marine Corps, for mechanized machine shops, instrument repair shops, etc.

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Association News

♦ The Missouri Vocational Association Committee on postwar planning met in the conference room of the State Department of Education, March 30 and 31, in Jefferson City, Mo.

The membership of the committee:

O. H. Day, chairman

Agriculture:
F. B. Houghton, Maryville; J. R. Thompson, Eldon

Home Economics:
Mrs. Atlanta Pummill, Houston; Miss Virginia Sloan, Marshall

Industrial Arts:
D. N. Valk, Maryville Teachers College; Doyle Kemper, State Department of Education

Trades and Industry:
O. H. Day, Kansas City; A. B. Jordan, St. Louis

Superintendents of Schools:
E. T. Miller, Hannibal; Worth McCluer, University City; T. S. Hill, Dexter

Ex-Officio Member:
George E. Kohrman, president, Missouri Vocational Association.

The conference was also attended by State Superintendent Roy Scantlin, Loyd E. Grimes, Lester Maddox, Glenn Smith, and Miss Rita Youmans from the State Department of Education.

The first part of the conference was devoted to the orientation of the various problems confronting vocational education in the state. One of these problems — the area school as it applies to vocational education — was discussed in some detail.

The committee was subdivided in order to facilitate the study of specific problems and reporting recommendations back to the whole committee for consideration. The Missouri Vocational

(Continued on next page)

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(Continued from previous page)

Association hopes to have a final report of this study completed by late summer or early fall.

The problems to be studied by the various subcommittees are as follows:

Group I

Chairman: D. N. Volk; members: T. S. Hill, Mrs. Atlanta Pummill, A. B. Jordan, J. R. Thompson.

Problems

1. Extension of vocational training opportunities more equitably over the state.
2. Development of closer working relationships between the various vocational services on the local level.
3. Correlation and co-ordination of general and vocational education courses and curriculums.
4. Correlation of practical arts and vocational education.
5. Relationships between public vocational education and vocational education by other agencies.
6. Surplus commodities and facilities.
7. Teacher training as it applies to vocational education in the secondary schools.

Group II

Chairman: Dr. Worth McCluer; members: Miss Virginia Sloan, Doyle Kemper.

Problems

1. Selection of students for vocational courses.
2. Bridging the gap between school and industry.
3. Work experience as an educational function.
4. Relationship of guidance to vocational education.
5. Teacher training as it applies to guidance services.

Group III

Chairman: F. B. Houghton; members: E. T. Miller, O. H. Day, Geo. E. Kohrman.

Problems

1. Adult education.
2. Reconversion training.
3. Education programs for veterans.
4. People's institutes or vocational technical training.
5. Effect of air transportation on vocational education.
6. Teacher training as it applies to adult education problems.

♦ Recently the executive committee of the Texas Vocational Association announced the appointment of Chris H. Groneman, acting head of the Industrial Education Department of the A. & M. College of Texas, as vice-president of the Texas Vocational Association in charge of the industrial-arts education division to succeed Mr. Sam Martin of Austin, who resigned.

This is a unique appointment for Mr. Groneman because he is also chairman of the industrial-arts division of the Texas State Teachers Association and has held this post since 1941.

Mr. Groneman is the author of five trade books and is a regular contributor of trade and professional articles to various educational magazines.

♦ Ninety members of the Milwaukee Industrial Arts Teachers Association visited the Ampco Metal plant, Milwaukee, Wis., on their annual spring vacation field trip. They studied developments in nonferrous metals, foundry practices, and the machining of special alloys. Archie Muehl, president of the association, John Rasmussen, field trip chairman, and Roy A. Radtke, head of the industrial-arts department of the public schools, directed the trip.

♦ The thirteenth annual meeting of the American Society of Tool Engineers, held in Detroit, March 23–24, 1945, resulted in the election of the following to guide the destinies of the Society during the next 12 months: president, C. V. Briner, Mgr., Gauge and Tool Division, Pipe Machinery Company, Cleveland, Ohio; first vice-president, A. M. Sargent, President and General Manager, Pioneer Engineering and Mfg., Detroit, Michigan; second vice-president, W. B. Peirce, vice-president, Research and Development, Flannery Bolt Company, Bridgeville, Pa.; third vice-president, Thomas P. Orchard, Partner and General Manager, American Tool Engineering Co., New York City; secretary, A. M. Schmit, General Manager, A. M. Schmit Company, Toledo, Ohio; treasurer, W. J. Frederick, President, Frederick Steel Co., Cincinnati, Ohio; assistant secretary-treasurer, W. A. Dawson, Chief Master Mechanic, The DeHaviland Aircraft of Canada, Ltd., Toronto, Ontario, Canada.

♦ The Connecticut Industrial Arts Association held its annual spring conference at the Teachers' College, New Britain, Conn., on April 7.

Addresses were by Mr. Paul D. Collier, director, Bureau of Youth Services, Connecticut Department of Education, and Dr. Stanley J. Pawelek, supervisor of Industrial Education, Baltimore, Md.

Officers elected for two years are: president, Hilding O. Sundberg, Hamden; vice-president, Ray C. Banks, Ansonia; vice-president, Charles Quinlan, Stratford; vice-president, Clifford Sawyer, Windsor; secretary, Ralph E. Duso, Fairfield; and treasurer, John J. Lewis, West Hartford. — *Ralph E. Duso.*

♦ An industrial education conference, sponsored by the Department of Vocational Education of the Detroit Schools and Wayne University, was held on March 23 in Detroit, Mich. This conference was planned for industrial-education teachers of the metropolitan area and members of the Industrial Education Training Council.

A general meeting was scheduled for 4:30 p.m. Earl L. Bedell, divisional director of technical and vocational education in Detroit, presided at this meeting. Dr. Waldo E. Lessenger, Dean of the College of Education at Wayne University, spoke on "The Conference Idea." He stressed the importance of having institute meetings planned for teachers to secure the newer developments in industrial education. Dr. Warren E. Bow presented Frank C. Moore, director of industrial-arts education in Cleveland, Ohio, and vice-president of the American Vocational Association. Mr. Moore spoke on the subject, "Today's preparation for Solving Tomorrow's Problems." He stressed the importance of being a well-integrated individual and pointed out several of the factors that make any teacher successful.

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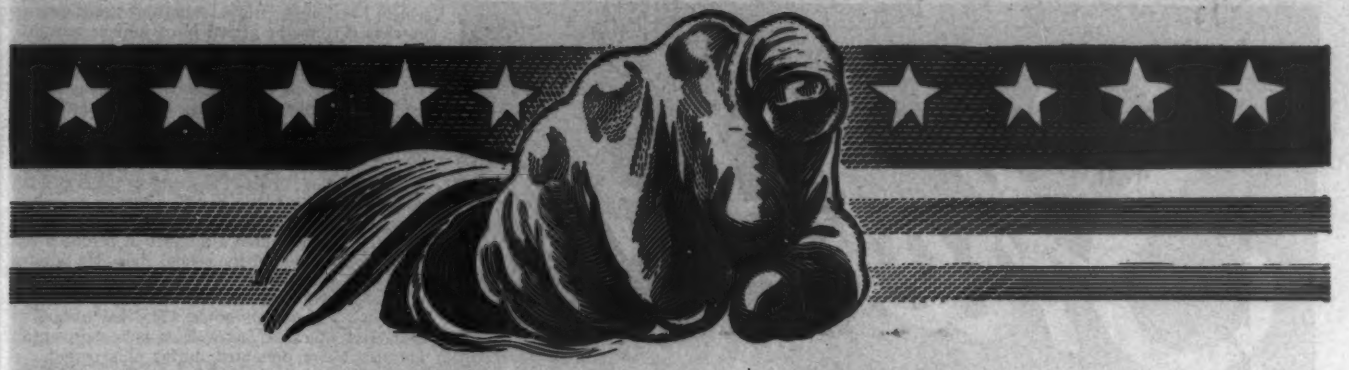

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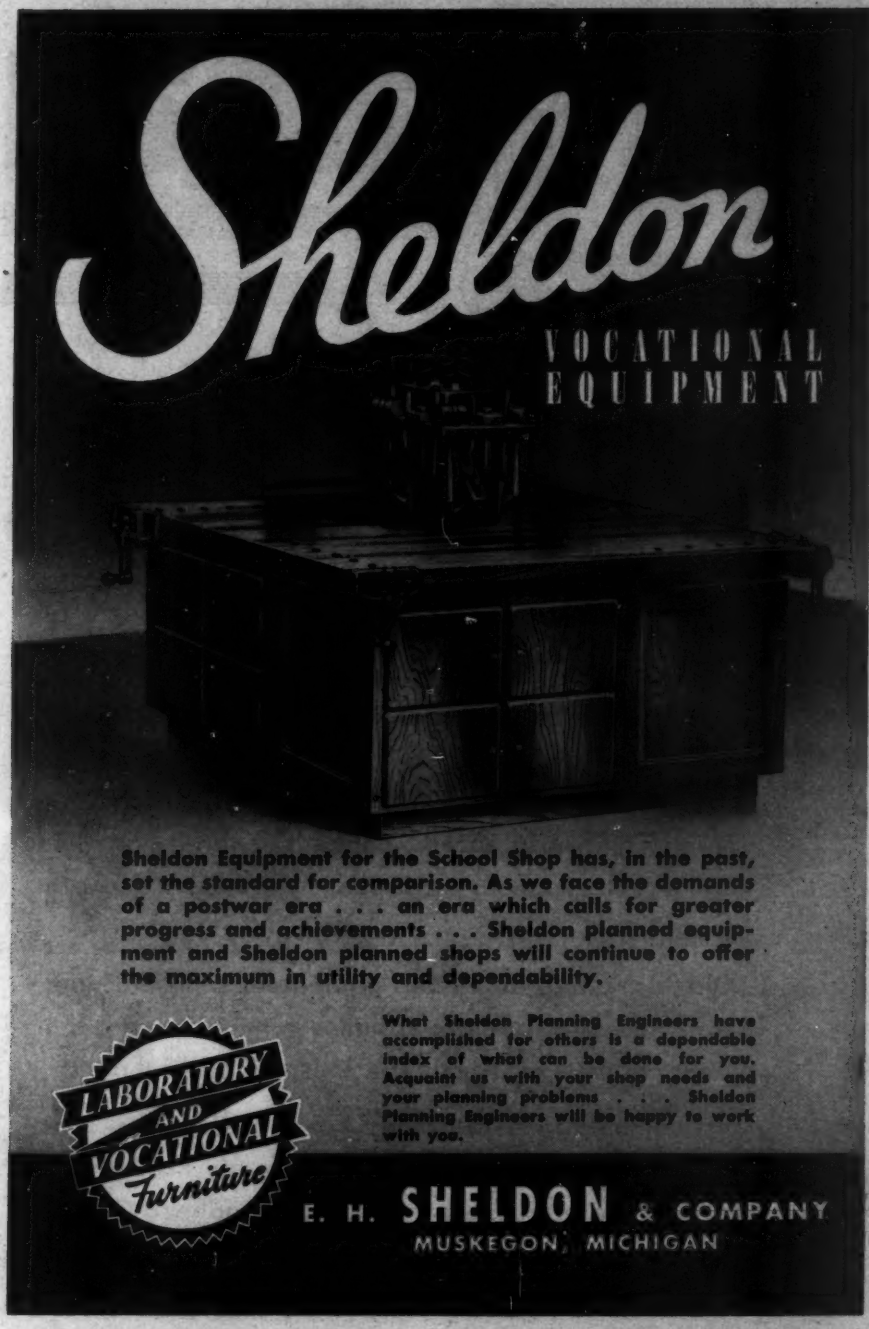
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which were made from scrap tools and fixtures purchased from the armed forces on the termination of war contracts. Fred Decker, vocational department head at the Southwestern High School, described the design and construction of jigs and fixtures used in the production of 500 folding chairs for the Red Cross. He stressed the importance of the planning involved in developing the jigs and fixtures. John Weimar, teacher at the Wilbur Wright Vocational High School, described the plan that had been put in operation to manufacture 200 4-in. heavy-duty machinists' vises. He demonstrated a number of precision jigs and fixtures made in the school shop. He pointed out the educational advantages of productive work in vocational schools.

Dinner was served at six. The key people in industrial education, as well as men representing industry, were presented during this period.

Five conferences were held simultaneously from 7:00 until 10:00 p.m. This provided an opportunity for teachers to attend the one that best served their needs.

Conference I: This conference was entitled, "Meeting the Educational Needs of the Returning Veteran." Norvan Jennerjahn, teacher at the Southeastern High School, served as the chairman. Thomas F. Garrity, manager of the War Information Center in Detroit, led the discussion. William Stirton, principal, Cass Technical High School, participated. Major A. D. Alguire from the State Office of Veteran's Affairs, discussed "Veteran Legislation." He believes that "veterans are not going to get the run around." A considerable amount of time at this conference was devoted to a question and answer period.

Conference II: This conference on "Tool and Tool Crib Problems," was attended by more than 50 people. The various speakers discussed the methods of hanging, checking, and caring for tools. A few of the ideas expressed were:

1. Inclined tool panels are more satisfactory than vertical ones.
2. Metal tool hangers and racks are more durable than those constructed of wood.
3. Tools should be visible for efficient checking rather than in drawers or on shelves.
4. Painting the outline of the tool on the panel aids in checking and getting them in the correct place.
5. Tool hangers should be constructed so that the tool will naturally fall in place and not require careful adjustment by the tool crib attendant.
6. The reconditioning of tools by pupils serves to increase their respect for equipment.

The following persons participated in this conference: Ernest Venk, Fordson High School; John Weimar, Wilbur Wright Vocational High School; Walter Jeske, Post Intermediate School; George Geck, Alger Elementary School; Paul Shattuck, Cass Technical High School; Roland Fraser, assistant director of vocational training for War Production Workers; Erick Keller, Burroughs Intermediate School; Carl E. Karlstrum, supervisor of vocational education as discussion leader; and Delmar Pardonnet, Jefferson Intermediate School, chairman.

(Continued on page 28A)

(Continued from page 24A)

The second part of the general meeting provided an opportunity for several people to report and demonstrate what is being done in the Detroit schools to maintain essential educational services with salvaged materials and limited supplies. Merrill C. Hamburg, supervisor of vocational education, introduced the panel discussing this matter. William Boyd, industrial-arts teacher at the Pattengill School, displayed a number of games and puzzles made from salvaged materials to be donated to convalescent soldiers. Cecil E. Zwickey, vocational department head at the Post Intermediate School, described several projects made from scrap material, especially projects for the woodworking shop that could be made from wooden boxes. Deo Duryee of the Wilbur Wright Vocational High School, demonstrated a number of teaching devices used in the machine shop

Walde E. Lessenger, Dean of the College of Education, Wayne University, stressed the importance of institute meetings

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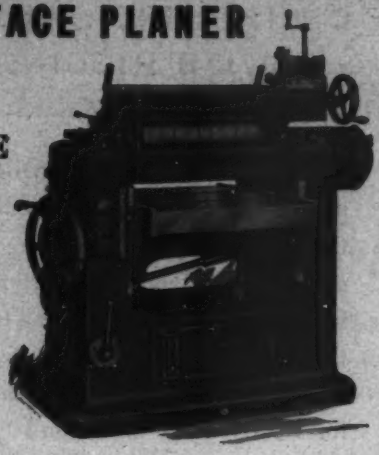

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12. **THE BINDING OF BOOKS—Perry & Beab.** Complete in coverage of how to make simple equipment for school shop use and step-by-step procedures in binding manuscripts, rebinding old books, repairing, making notebook covers, blotter cases, etc. **Cloth, $2.25.**

13. **BLOCK PRINTING CRAFT—Perry.** Purchased by the Army in large lot for use in rehabilitation. Full coverage of tools and procedures for making linoleum and wood blocks. Color illustrations show steps in color printing. Many other illustrations. **Cloth, $3.85.**

14. **GLASS AND GLAZING — Ericson.** Kinds of glass and uses in repair or replacement in various types of jobs. Tools and procedures of the glazing trade, adapted to school practice. Written by an industrial-arts leader. **Cloth, $2.00.**

15. **THINGS TO MAKE—Klenke, VOLUME I.** Contains Books 1-5 of Klenke's famous series of furniture projects. More than 100 working drawings, with photographs of finished pieces. Projects on the home workshop, for camp and game room, for garden, for home, and projects made from odd scraps of wood. **Cloth, $4.25.**

16. **THINGS TO MAKE—Klenke, VOLUME II.** Books 6-10 in the series; projects on tables, other living-room and dining-room furniture, furniture for a boy's room, and small pieces of furniture. **Cloth, $4.00.**

17. **DECORATIVE WOODWORK—Grimwood and Goodyear.** A masterwork on functional and surface decoration, both traditional and modern. Beautiful photographs of finished pieces and details; sketches and sectional drawings. **Cloth, $6.00.**

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(Continued from page 26A)

Conference III: Leon R. Sapala served as chairman of a conference where "Electronics, Its Place in a Program of Industrial Education," was discussed. Mr. H. L. Lindstrom of the Westinghouse Electric and Manufacturing Company showed a very interesting movie on electronics at work. The purpose of this film was to take the mystery out of electronics and outline the six functions of electric control tubes. In the second part of the program, Mr. Myron Zuckner of the Mackworth G. Reese Corporation and the Electronic Control Corporation, gave a practical demonstration of control units used in industry. Andrew D. Althouse, supervisor of vocational education, Detroit Schools, led the discussion.

Conference IV: This conference was entitled "Some Methods of G.I. Education." William B. Peterson, industrial-arts teacher at the Neinas Intermediate School, served as chairman. Dr. Arthur C. Stenius, co-ordinator of the departments of visual, radio, Children's Museum, and safety education, served as discussion leader. Mr. Ralph J. Hullinger conducted a pupil, teacher-trainer demonstration on "Training Techniques with Slide Films." Slide films on the three types of aiplane propellers and their care were presented. Audience participation in caption reading and question answering was carried on and all agreed that slide film technique of instruction has tremendous value in instructional use in our school vocational and technical training program. Commensurate with our aim and program in vocational education in public instruction, our interest has been focused on the training devices and techniques employed in the tremendous instructional program in training the personnel of our armed forces. The successes and some of the methods employed in GI Education as presented by Chief Motor Machinist, Haldon Robertson, USNR., Packard Marine Engine School, were due to the following factors: (1) unlimited moneys and instructional material; (2) fund for replacement of parts destroyed; (3) use of cutaway models; (4) use of instructional film, sound and slide; (5) controlled class size, one instructor per seven men; (6) controlled time, with no disciplinary problems; and (7) immediate purpose behind the instruction.

Conference V: At this conference, Estell H. Curry, chairman, presented William Brown, Paul Nutten, Robert Martin, Earl Brown, William Boyd, Herman Aho, Howard Brown, Harold Hill, Floyd Burgess, and Manson Taylor, teachers in the Detroit Public Schools, who demonstrated the use of various teaching aids that they had developed and are using in their schools. Some of the subjects covered were assignment and roll call board, use of pictures in teaching, aids in teaching drawing, aids showing how projects are developed, and devices used in making Red Cross toys. This conference had a large attendance which proves that teachers are still interested in learning new ways to teach.

The over-all program for this conference was planned by the following committee: Gerald Baysinger, chairman; Estell Curry; Norvan Jennerjahn; Herbert Kolkind; Delmar Pardonnet; William B. Peterson; Leon Sapala; and Robert M. Shields, secretary. Professor G. H. Silvius, Wayne University, served as adviser to this committee.

♦ Dr. John A. Whitesel of Miami University has been appointed by the Policies Board of Epsilon Pi Tau Fraternity as Acting National Secretary. The Executive Secretary since its beginning, Major William E. Warner of the Ohio State University, is now serving in General Eisenhower's command in the European theater of war.

The national honorary professional fraternity has 22 chapters across the United States from Massachusetts to California. The address of the national office will now be Oxford, Ohio.

♦ A visual education conference with the following program will be held at the Pittsburg Teachers College, Pittsburg, Kans., in June. It will be headed by Dr. Walter A. Wittich of the University of Wisconsin and Lt. James E. Brown, Officer-in-Charge, training aids section, Ninth Naval district.

Discussions, demonstrations, and displays of latest equipment will feature the conference, Dr. Otto A. Hankhammer, chairman, said.

Wednesday, June 13th
- 10:00–11:45 Addresses: "The Power of the Teaching Film," Dr. W. A. Wittich
- "How Training Aids Materials are Serving the Armed Forces," Lt. James E. Brown, USNR
- 1:30–3:30 Demonstrations, secondary level, Dr. W. A. Wittich
- 4:00–5:00 Address: "College-Level Implications of the Armed Forces Training Aids Program," Lt. James E. Brown, USNR

Thursday, June 14th
- 10:00–10:55 Address: "Newest Tool to Learning," Dr. W. A. Wittich
- 11:00–12:00 Conferences with Dr. Wittich and Lt. Brown
- 1:30–3:30 Demonstrations, elementary level, Dr. W. A. Wittich
- 4:00–5:00 Conferences with Dr. Wittich and Lt. Brown

New Publications

Household Mechanics

By Earl L. Bedell and Ernest G. Gardner. Cloth, 241 pages, 8⅜ by 11⅛ in., illustrated. Price, $2. International Textbook Company, Scranton, Pa.

This is the second edition of this useful text for the junior high school. It has been enlarged and contains 148 jobs and 642 illustrations.

Many of the illustrations used in this edition portray the present trend of offering industrial-arts courses to both boys and girls.

The ten chapters cover woodworking, metalworking, painting and finishing, care of electrical appliances, water supply, care of doors and windows, use of concrete and plaster, use of rope and twine, and setting up a home workshop.

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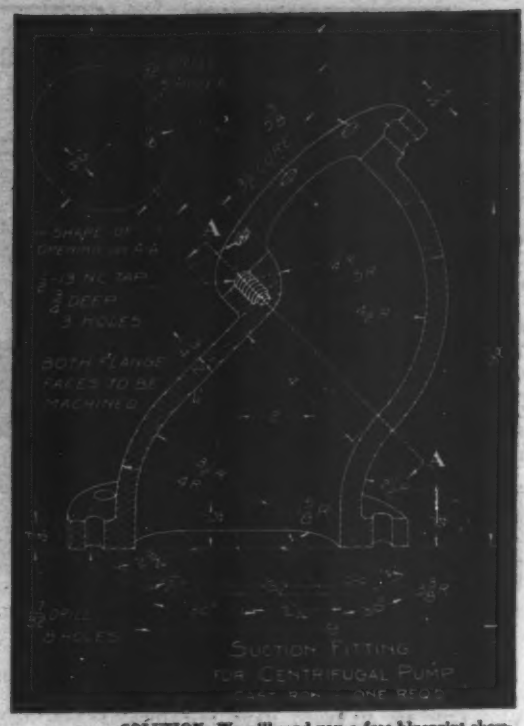

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(Continued from previous page)

Job Safety Training Manual

By Kenneth L. Faist and Stanton M. Newkirk. Spiral binding, imitation leather, 52 pages, 5½ by 8⅜ in., plus three small pamphlets. Price, $5. National Foremen's Institute, Inc., Deep River, Conn.

An intensive training program for supervisors. It has been developed to cover the subject in five two-hour sessions.

Each of the sessions is fully outlined and all steps that the conference leader is to take up with the members of his class are carefully indicated.

It's Fun to Make It Yourself

Edited by Stacey Maney. Cloth, 384 pages, 5⅜ by 8⅞ in., illustrated. Published by The Journal of Living Publishing Corp., New York, N. Y.

A delightful and helpful book for the homecrafter who not only has a shop but wants to work in it, too.

The arrangement and equipping of the home workshop is discussed as is also the sharpening and care of tools. Then the many jobs that arise in and about the home are clearly illustrated and described.

Competitive Debate

By George McCoy Musgrave. Cloth, 147 pages, 5¼ by 7⅞ in. Price, $1.25. Published by H. W. Wilson Co., New York City.

A good exposition of the rules and customs of debate, how to construct your case, and lay out your strategy.

The book also contains good suggestions for those who have to judge debates.

"HSC" High-Speed Brake Equipment for Types A, B, and C, Diesel Locomotive Units and Cars

By C. M. Drennan. Paper, 69 pages, 8½ by 11 in., illustrated. Price, $3. American Technical Society, Chicago, Ill.

A practical textbook for the instruction of locomotive engineers and firemen. It describes the parts of the locomotive equipment in detail and makes use of many sectioned drawings to clarify the description.

Your High School Record — Does It Count?

Compiled by Robert D. Falk. Cloth, spiral binding, 124 pages, 8½ by 11¼ in., illustrated. Price, $2.25. Published by South Dakota Press, Vermilion, S. Dak.

This is an excellent teaching aid to help the high school student develop the right attitude toward the work that he does at school and the preparation he needs for his future life's work.

Arc Welding Symbols

Prepared by Hobart Brothers Co., Troy, Ohio.

16¾ by 21½-in. wall chart showing the typical welded joints, sections, and symbols used by the welding industry to acquaint the welder with what he is to do on a given job.

Handbook of Cumulative Records

Federal Security Agency, U. S. Office of Education.

This is Bulletin 1944, No. 5, published as a report by the National Committee on Cumulative Records.

It describes how a cumulative record system may be started, and shows how it may be used in the elementary and high schools.

It also touches upon such subjects as educational psychological tests, recording of reading ability, habits, and interests.

Careers in the Steel Industry

By Captain Burr W. Leyson. Cloth, 191 pages, 5⅓ by 8⅛ in., illustrated. Price, $2.50. E. P. Dutton & Co., Inc., New York, N. Y.

This book presents an interesting picture of the steel industry as a basis for the reader's determination as to what field of activity in the industry to choose for his life's work.

The 14 chapters in the book treat the subject under the following headings: The History of Steel; How Iron Is Made; The Making of Steel; Steel in the Laboratory; Structural Steel; Steel at War; Steel Tubing; Stainless Steel; How Steel Is Welded; Making Bent Steel Tubing; The Fight Against Corrosion; Pressing and Stamping; Steel in Postwar Housing; and Armor Plate.

Careers in Business for Women

By Dorée Smedley and Lura Robinson. Cloth, 224 pages, 5⅓ by 8⅛ in. Price, $2.75. E. P. Dutton & Co., Inc., New York, N. Y.

This book describes the place women occupy in business, points out the many new jobs that have been created during these past few years, and then shows the reader how to prepare for entering and eventually succeeding in the many business occupations now open to women.

Practical Design for Arc Welding — Volume 2

By Robert E. Kinkead. Cloth, 8¾ by 11¼ in. Plates 101 to 200. The Hobart Brothers Company, Troy, Ohio.

These 100 plates contain many suggestions for fabricating and welding tubular members and connections.

The table of short cuts to design ideas will be found especially helpful by the designer confronted by the many tasks now arising in industry.

Paths to Better Schools

American Association of School Administrators, 1201 Sixteenth St., N.W., Washington 6, D. C. Cloth, 416 pages, 6⅛ by 9⅛ in., illustrated. Price, $2.

This is the twenty-third year book prepared by this organization. The subject is divided into nine chapters under the following titles.

I. Equal and Universal Access to Educational Opportunity
II. Physical Fitness
III. Preparing Youth for Occupational Efficiency
IV. Citizenship
V. Better Ways of Learning
VI. Those Who Teach
VII. Federal-State-Local Relations
VIII. Some Emerging Truths in School Finance
IX. Schools of the People

The Influence of Modern Glues on the Utilization of Wood

By W. F. Leicester. Paper, 17 pages, 4¾ by 7⅝ in. Casein Company of America, 350 Madison Ave., New York 17, N. Y.

An excellent exposition of how the utilization of wood is being consistently increased because of the service rendered by the modern glues.

This basic tool should be in every school shop to teach students the quick, easy way to do precision work on metals, alloys, plastics, wood, horn, bone, glass, etc.

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The Handee uses 300 accessories to grind, drill, polish, rout, cut, carve, sand, saw, sharpen, engrave. Runs at a speed of 25,000 r.p.m. and fits any socket. Perfectly balanced. Weighs only 12 oz. Postpaid with 7 Accessories, $18.50.

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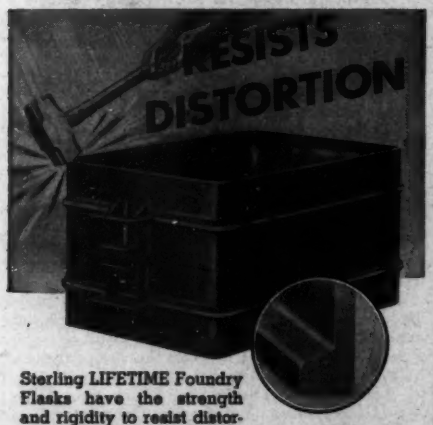

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Sterling FOUNDRY FLASKS
STERLING WHEELBARROW COMPANY MILWAUKEE WIS. U.S.A.

Shop Equipment News

New Products—Publications

STANLEY NO. 214 UNISHEAR

The Stanley No. 214 portable electric shear, which is light and easy to operate, cuts 14-gauge hot rolled steel and other sheet materials in proportion. It has fully demonstrated its usefulness in many plants where sheet metal, aluminum, and galvanized iron are fabricated.

Stanley Unishear

No. 214 Unishear has a simple, improved blade motion that *feeds in* the work so that little effort is required by the operator to cut straight lines, curves, angles, and notches without distorting the material. Blades can be removed for resharpening and replaced quickly. Duplex handle permits the operator to grip at position most convenient for use. There is a slide operated switch conveniently located in the handle.

The Universal type motor is available in 115, 220, 230, or 250 volts.

For further information, address Stanley Electric Tools, Division of The Stanley Works, New Britain, Conn.

For brief reference use IAVE—610.

RITEOHM PRECISION RESISTORS

Two new series of Riteohm Precision Resistors — Series 82 and 83 — are announced by the Ohmite Manufacturing Co., 4835 Flournoy St., Chicago, Ill. These are additions to the Ohmite Precision Resistor family which includes the well-known Series 71, 81, and 90.

Precision resistors

Both new units are pie-wound to 1 per cent accuracy. Specially enameled alloy resistance wire is noninductively pie-wound on a nonhygroscopic ceramic bobbin which has a hole through the center for a No. 6 screw. After being wound, the units are vacuum impregnated with a special varnish which provides additional insulation and thoroughly protects the winding against humidity. The resistors can be supplied with a varnish coating containing a fungicidal agent, thus making the units particularly suited for use in the tropics.

The Riteohm 82 is available in three sizes — 11/16-in. diameter by 1⅛ in., 1 7/16 in., or 1¾ in. long for the 2, 4, and 6 pie units respectively. The minimum resistance is .1 ohm for all units and the maximum is 400,000 ohms for the 2 pie unit, 750,000 ohms for the 4 pie, and 1 megohm for the 6 pie unit.

The Riteohm 83 is available in three sizes — ½-in. diameter by 7/16 in., ⅝ in., or 1 in. long. The first two units are 2-pie while the third is a 4-pie unit. The minimum resistance is 10 ohms for all units and the maximum is 200,000 ohms for the small 2-pie unit, 400,000 ohms for the large 2-pie, and 800,000 ohms for the 4-pie unit.

A few common applications for these resistors are voltmeter multipliers, laboratory equipment, radio and electrical test sets, attenuation pads, and electronic equipment requiring extremely accurate resistance components.

For brief reference use IAVE—611.

A USEFUL PORTABLE DESK

A sturdy portable desk with a multiplicity of shop uses is now being marketed by Lyon Metal Products, 15 Clark St., Aurora, Ill.

Portable metal desk

The portable model No. 2131–15 shown here stands on 3-in. swivel casters and has a positive brake attachment. The over-all size of the unit is 34½ in. wide, 30 in. deep, and 53 in. high (43 in. high in front).

The desk hood provides adequate space for the storage of working papers and has a smooth 30-in. desk top with a 3-in. over-all slope. The 24 by 28 by 3½-in. drawer is equipped with a lock.

Other steel desks also available include the counter type model (no legs); cabinet desk; desk high type; stationary type, and a model which fastens to the wall.

For brief reference use IAVE—612.

NEW FELLOWCRAFTER'S CATALOG

Fellowcrafters, Inc., 130 Clarendon St., Boston 16, Mass., have recently published their fourteenth catalog describing their books and stock of tools and materials.

The catalog covers leathercraft, costucraft, braiding and knotting, plastics, amberol, ambercast, custoloid, beadcraft, woodburning and foil transfer, felt craft, cork craft, glass etching, hand-loom weaving, fiber craft, block printing, colors and finishes, plastico-Rok, silk screen process, woodcraft, castings, pottery, carving, metalcraft and jewelry, and airplane model building.

For brief reference use IAVE—613.

HOW TO MEASURE IN MICRO INCHES

"How to Measure in Micro Inches is a 20-page booklet edited for both the novice and expert. It deals with the fundamentals of precision measurements, showing how these principles are applied to production work.

(Continued on page 33A)

Examine These Practical Vocational Training Texts—

VISUALIZED PROJECTS IN WOODWORKING

By Sowers

Visual instruction showing the finished product and each step in its construction. Probable price, $1.60

WOODWORKING PROJECTS FOR INDUSTRIAL ARTS STUDENTS

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Original projects — wide variety — shop drawings — adaptable designs. $1.40

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Slide Rule Simplified (with rule)	3.50
Slide Rule Simplified (without rule)	2.50
Fundamentals of Radio and Workbook (PIT)	2.50
Fundamentals of Electricity and Workbook (PIT)	2.50
Machine Tool Guide (details covering 61 makes)	7.50
Building Insulation (2nd edition)	3.50
Diesel Locomotives (Mechanical Equipment)	4.00
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ASK FOR BULLETIN 319-A describing the complete line — Bench and pedestal types — 6" to 12" wheels.

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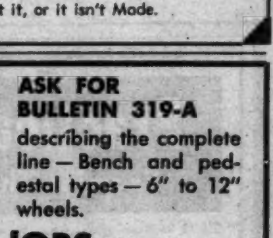

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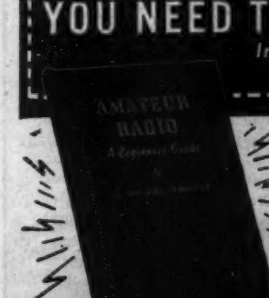

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This Lewis 10" Metal Shaper is a **doubly sound investment** in your shop training program!

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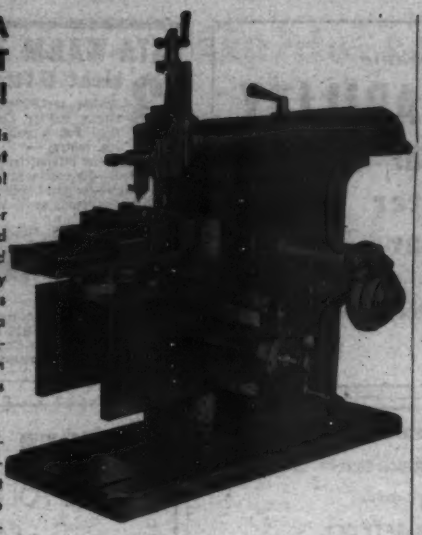

Send today for the Lewis Catalog describing 22 other practical metal and wood-working tools for your school shop — find out the many advantages of standardizing on the Lewis line for your projects. There's no obligation at all!

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Use inexpensive staple tacks. List Price, $3.00

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The Best Way to Tack Things

Used in industrial production work. Tack upholstery, wire screens, shades on rollers, dozens of other uses. Easy to operate — just squeeze the handle. Hold material in place with one hand, tack it with the other. Tack within 1/16" of an edge and in close quarters where you can't swing a hammer.

STAR Model S122P Stapler

A stapler and light tacker combined. Handy — fits in pocket. Squeeze it to staple papers — Holds 105 Standard Staples.

Swing the base down and around and it becomes a light duty tacker. Fine for tacking up charts, pictures and papers on walls, drawings on drawing boards.

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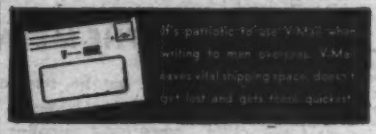


Send for catalog of the Star line of tackers and paper fasteners.

★ Star Paper Fastener Co.

NORWALK Dept. AE CONNECTICUT

(Continued from page 30A)

The booklet contains many illustrations and charts to show the relationship of dimensions as affected by the temperatures of the materials being measured. It shows how the engineering department and production department can work together in maintaining close dimensions in the fabrication of products; it also shows various combinations of gauge blocks and instruments used in measuring very fine dimensions. The new gauging instruments are introduced, and a brief description of the new mobile inspection unit is given.

The booklet is available to anyone who writes for it to Continental Machines, Inc., 1301 Washington Ave., So., Minneapolis 4, Minn.

For brief reference use IAVE—614.

INFORMATIVE BOOK FOR THE HEAT TREATER

The newly revised *Data Book for the Heat Treater, The Stewart Vest Pocket Heat Treating Data Book,* issued by the Chicago Flexible Shaft Co., 5600 W. Roosevelt Road, Chicago 50, Ill., contains a mass of valuable information for all who have anything to do with the heat-treatment of steel.

The book contains tables showing the specifications of the various kinds of steels, lists their characteristics and applications, and explains the heat-treating practices applicable to each of the types.

The various kinds of furnaces manufactured by the firm are also discussed.

A number of useful tables have been appended.

This firm also publishes the "Stewart Handbook" which contains information on heat-treating and equipment for schools and laboratories.

For brief reference use IAVE—615.

A STRIKING DISPLAY ROOM

The Engineering Mfg. Co., 702 Clara Ave., Sheboygan, Wis., has recently opened a new show room to display their products at 11 S. LaSalle St., Room 1217, Chicago, Ill.

This tastefully decorated room was specially designed by Harold R. Masten and George Eliott, Interior Designers, Decorators, and Architects.

Two views of the Engineering Manufacturing Company's salesroom

The arrangement of the display room is such that the eye is at once attracted to the displayed goods which are illuminated by concealed fluorescent lights.

The cabinets are further arranged so that all of the displayed articles can be examined without stooping or bending.

FOURTH ARMY-NAVY PRODUCTION AWARD

For the fourth time employees of The DeVilbiss Company, Toledo, Ohio, have won the Army-Navy E Award for high achievement in the production of war material.

SILVER BURDETT HAS A BIRTHDAY

Silver Burdett Company reaches its sixtieth birthday this year. Edgar O. Silver, the founder would scarcely recognize the offspring of the humble publishing business he set up in Boston in 1885. His list of one item, *The Normal Music Course,* has grown and expanded to include basic texts in the major subjects on both primary and secondary school levels, and Silver Burdett Company has emerged as one of the country's leading textbook publishing houses with offices in New York, Chicago, and San Francisco.

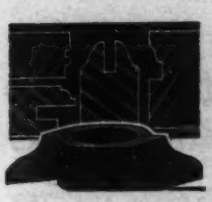
WINNERS OF NATIONAL HOME WORKSHOP CONTEST

The first prize in the Delta Home Workshop Contest, amounting to $1000 was won by T/5 Paul R. Leonard, Transportation Corps Detachment, Brooklyn Army Base, Brooklyn, N. Y.

The winners of the second and third prizes are:
Ted Kostew, Ozone Park, N. Y., $500.
Felder S. Weeks, Milan, Tenn., $250.

SKILSAW ANNOUNCES APPOINTMENT OF NEW OFFICERS

The Board of Directors of Skilsaw, Inc., Chicago, manufacturer of portable electric Skiltools, has recently promoted E. J. Kelley to the office of vice-president in charge of engineering, and named J. L. McManus secretary of the company. E. B. McConville, treasurer, was elected to membership on the board. All three men will continue to serve on the operating committee.



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Materials become increasingly scarce. We are filling orders to the best of our ability, but even some items in our War Catalog are already out of stock. All new types of material are found, fliers will be issued to supplement our catalog. Be sure you are on our mailing list.

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They're safe, fool-proof, built "like a boiler" to take plenty of shop abuse. Automatic Thermostat controls glue temperature; no burned or spoiled glue; no water jacket troubles; no fire hazard. PLAY SAFE—teach students modern, safe gluing methods with this superior "Hold-Heet" Electric Glue Pot — used by industry and schools everywhere!

1 qt. $16 4 qt. $24
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110 or 220 Volts

RUSSELL ELECTRIC COMPANY
364 W. Huron St., Chicago 10, Ill.

ELECTRIC
MOTOR PARTS
FOR ALL MAKES

ALSO ALL MATERIALS AND TOOLS USED IN THE MOTOR REPAIR SHOP
Free Catalogue to Instructors
READING ELECTRIC CO., Inc.
200 William St., New York

Guide to Products and Services

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605	Badger-American Electrotype Co.	34A
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Industrial Arts and Vocational Education
540 North Milwaukee St., Milwaukee 1, Wis.

Please send information offered in the advertisements we have encircled.

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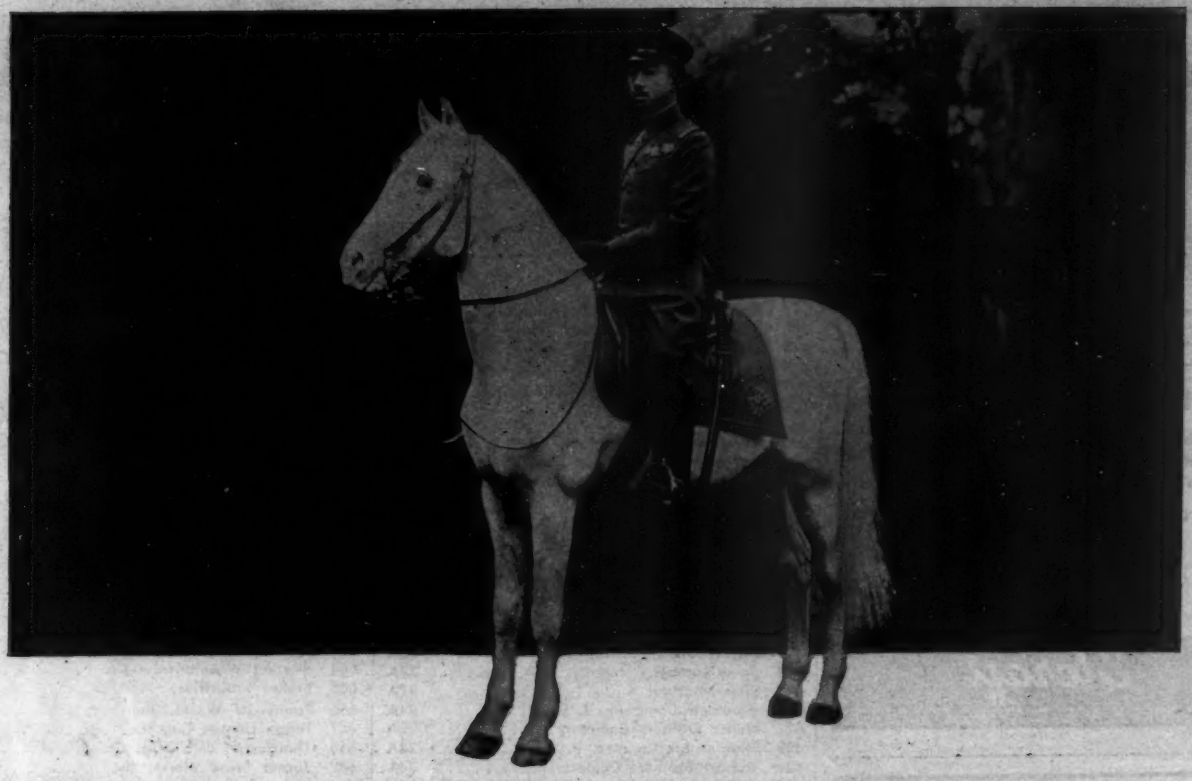


LET'S GET THE ADMIRAL HIS HORSE!

Official U. S. Navy Photo

Admiral Halsey has his eye on a fine white horse called Shirayuki.

Some time ago, at a press conference, he expressed the hope that one day soon he could ride it.

The chap *now* in Shirayuki's saddle is Japan's Emperor—Hirohito.

He is the ruler of as arrogant, treacherous, and vicious a bunch of would-be despots as this earth has ever seen.

The kind of arrogance shown by Tojo—who was going to dictate peace from the White House . . . remember?

Well, it's high time we finished this whole business. High time we got the Emperor off his high horse, and gave Admiral Halsey his ride.

The best way for us at home to have a hand in this clean-up is to support the 7th War Loan.

It's the biggest loan yet. It's two loans in one. Last year, by this time, you had been asked twice to buy extra bonds.

Your personal quota is big—bigger than ever before. So big you may feel you can't afford it.

But we *can* afford it—if American sons, brothers, husbands can cheerfully afford to die.

FIND YOUR QUOTA . . . AND MAKE IT!		
IF YOUR AVERAGE WAGE PER MONTH IS:	YOUR PERSONAL WAR BOND QUOTA IS: (CASH VALUE)	MATURITY VALUE OF 7TH WAR LOAN BONDS BOUGHT
$250	$187.50	$250
225-250	150.00	200
210-225	131.25	175
200-210	112.50	150
180-200	93.75	125
140-180	75.00	100
100-140	37.50	50
Under $100	18.75	25

ALL OUT FOR THE MIGHTY 7th WAR LOAN

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

This is an official U.S. Treasury advertisement—prepared under the auspices of Treasury Department and War Advertising Council

We Serve the War Effort . . .

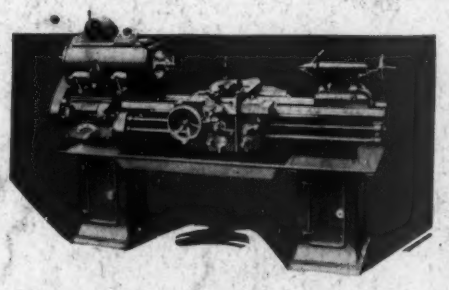
It has been our privilege to supply hundreds of thousands of copies of AUTO MECHANICS especially for the United States Armed Forces Institute, a correspondence school for instructing our fighting men all over the world. Great quantities are still to be printed. These volumes were prepared by the foremost author of automotive material in the country today, Ray F. Kuns. His texts, AUTOMOTIVE ESSENTIALS and AUTOMOTIVE SERVICE, are the recognized leaders in their field. We are proud to co-operate with such capable authorship in making a most significant contribution to education within the Armed Forces.

THE BRUCE PUBLISHING COMPANY

NEW YORK 18 **MILWAUKEE 1** **CHICAGO 1**

How like a Steppingstone...

To the trainee, a training lathe is indeed a means of progress—a stepping stone. It is important then that the lathes he uses in the school shop are up to date and versatile in operation. In this way the young lathe operator is able to gain the fine working knowledge and varied skills that will stand him in good stead when his name goes off the school roll and onto the pay roll. Since industry uses more geared head lathes than any others, it is obvious that the trainee's progress can best be served by lathes so equipped. Equip your shop with LeBlond Super Regal Lathes, the geared head trainers with the same built-in precision and operating efficiency found in the heavy-duty lathes the trainee will eventually use "on the job."



Since 1887 the world has been turning to LeBlond for turning equipment. Write for full details and specifications.

WRITE FOR FULL DETAILS AND SPECIFICATIONS.

THE R. K. LeBLOND MACHINE TOOL CO.
CINCINNATI 8 . . . OHIO

LARGEST MANUFACTURER OF A COMPLETE LINE OF LATHES

September , 1945 Vol. 34, No. 7

Periodical MR

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Co-Operative Relationships of Industrial Arts and Vocational Education

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DETROIT

Administrative Aspects of Vocational School Roster Making

Map Making and Map Reading for Preinduction Pupils

Instructor Guidance

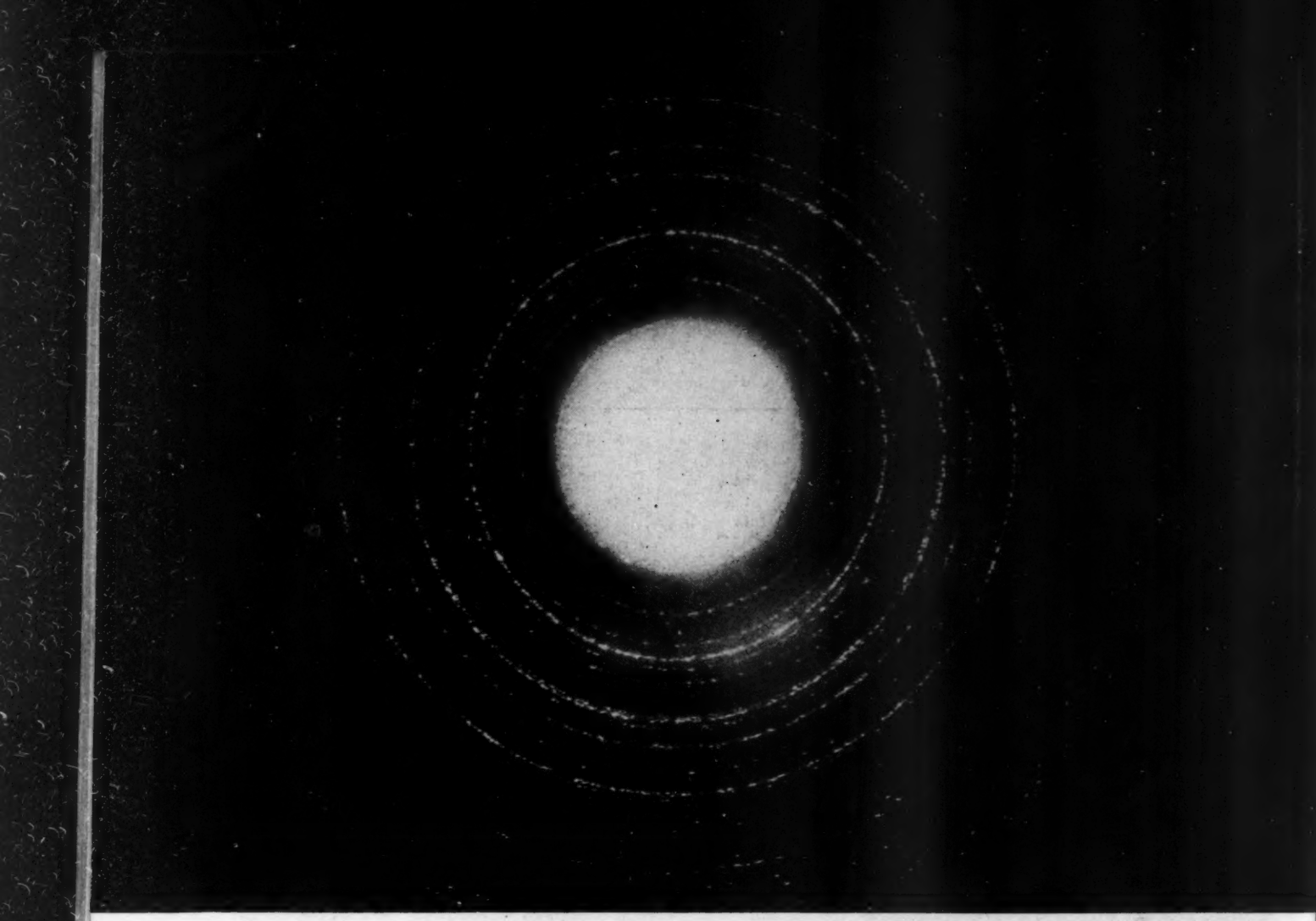

Photo courtesy Radio Corporation of America (For explanation see footnote)*

IT EXISTED SINCE THE BEGINNING OF TIME...

It must strike every well-read and intelligent person that all the achievements, all the accomplishments, all the wonderful things that pour in a steady and breath-taking stream from the laboratories and designing rooms of America existed in potential from the very beginning of time.

Look at the especial magic of today which may revolutionize the social and industrial character of our civilization... the magic which on the one hand enables science to look with learned and inventive eye into the atomic constitution of matter and perhaps later into the very atom itself... and on the other hand enables men to see, hear and even control events taking place miles away... the magic which automatically controls machinery, heats materials and heals mankind... the magic of the electrons.

These celestial wanderers of the "inner space" have always existed, yet the prodigious powers they possess have been unsuspected until, relatively, a mere moment ago.

Since the beginning of human time that men possess ability in common has also been so unsuspected that when "All men are created equal" was stated as a political conviction it began an earthquake that is still reverberating around the globe. And today it is the especial responsibility of educators to complete that statement... to give each youngster a vision of the possibilities, to create within him a desire and a hunger, to indicate the steps that lead from his hunger to his vision.

In this educational process nothing is trivial. Men who teach mechanical drafting, for example, know the necessity to catch the interest of the beginning student at its flood. For then the instructor can inspire interest into concern and concern into ambition. He can establish habits of work and standards of thought, the consequences of which will be tremendous.

In this critical situation, can the very tools of the student's work be regarded as trivial? Dare the instructor select drawing instruments carelessly and treat them cavalierly? Tools of more than creation, instruments in the vital educational process, the student's drawing set should be, must be the very finest the student can afford.

*Electronic bombardment of matter reveals diffraction pattern and position of atoms, identifies crystal structure, leading to accurate analysis, crucial to man's struggle to control his environment.

Army-Navy "E" Production Award for Excellence in Manufacturing, Drafting and Surveying Instruments and Supplies for the Armed Services of the United States.

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